

Refrigeration Service Engineer

VOL. 14 NO. 6 TECHNOLOGY DEPT.

DET JUNE . 1946



Refrigeration of Pharmaceutinals

— Good Service Market (See page 29)

NEW



WITH
SPRING
LOCK

COLDSPOT CHICAGO SEAL

**ASK YOUR WHOLESALER
FOR THIS IMPROVED CHICAGO
COLDSPOT REPLACEMENT SEAL**



**YOUR WHOLESALER
HAS A COMPLETE LINE OF
CHICAGO REPLACEMENT
SEALS AND VALVE PLATES**



**For better
performance
use
CHICAGO SEALS
and
VALVE PLATES**

CHICAGO SEAL CO. 20 N. WACKER DR., CHICAGO 6, ILL.

THE REFRIGERATION SERVICE ENGINEER, Nickerson & Collins Co., Publishers, 435 N. Waller Ave., Chicago 44, Ill. Published monthly. Vol. 14, No. 6, June, 1946. Entered as second class matter March 4, 1938, Chicago, Ill., under the Act of March 3, 1879. Subscription in the United States, \$2.00 per year; all other countries, \$3.00 per year.

The Ansul Research Staff
REPORTS ON

WAX

CAUSES FROZEN VALVES *too!*

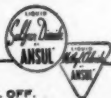
**WAX IN
OIL-REFRIGERANT
MIXTURES**

These photographs show the results of practical machine tests in which 10% oil was circulated with the refrigerant. Valve temperature was approximately -25 degrees Fahrenheit. Every effort was made to exclude moisture. Within a few hours wax separated throughout the body of the expansion valve and the forepart of the expansion coil adhering firmly to the metal.

***** Ansul Wholesalers are ready and equipped to render an intelligent, co-operative service to refrigeration engineers and maintenance men on problems which arise from time-to-time in the operation of refrigerating systems.

FOR EXAMPLE:

Samples of ice machine oils submitted by users of Ansul Refrigerants to Ansul Wholesalers, are tested by Ansul laboratories without charge by the Ansul Standard Wax-Oil Separation Method. This approved method, developed and standardized especially for use in connection with oils used in refrigerating systems, provides an accurate determination of the amount of wax which separates from an oil at low temperatures.



*REG. U. S. PAT. OFF.

A wax deposit, about 1/8 inch thick, formed on the plate carrying the ball-valve enclosure and almost completely clogged the outlet of the expansion valve.



Wax deposited on the ball-valve closure plate

REMEDIES

To eliminate wax trouble in expansion valves and coils:

- ***
1. Use an oil which separates little or no wax from its mixture with the refrigerant at the operating temperature of the valve.
2. Install an oil trap to cut down the amount of oil (and consequent wax) circulating with the refrigerant.



Wax deposited in outlet of expansion valve

SEND FOR THIS BULLETIN

An informative reprint, "THE SEPARATION OF WAX FROM OIL-REFRIGERANT MIXTURES," will be sent on request. No obligation. Just address...



Ansul refrigerants are available at leading wholesalers everywhere

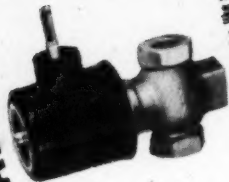
ANSUL CHEMICAL COMPANY
REFRIGERATION DIVISION, MARINETTE, WISCONSIN

DISTRIBUTORS FOR KINETIC'S "FREON-11," "FREON-12," "FREON-21," "FREON-22" AND "FREON-113"

June, 1946

THE REFRIGERATION SERVICE ENGINEER

OF
"DETROIT"
SOLENOID
VALVES



No. 603—This reliable valve, like all "W." valves is designed for use with any field standard is designed here. Furnished with ball and seat, brass, 1/8", 1/4", 1/2", 3/4", 1", 1 1/2", 2", 3", 4", 6", 8", 10", 12", 14", 16", 18", 20", 24", 30", 36", 42", 48", 54", 60", 72", 84", 96", 108", 120", 144", 168", 192", 216", 240", 270", 300", 324", 360", 384", 408", 432", 456", 480", 504", 528", 552", 576", 600", 624", 648", 672", 696", 720", 744", 768", 792", 816", 840", 864", 888", 912", 936", 960", 984", 1008", 1032", 1056", 1080", 1104", 1128", 1152", 1176", 1200", 1224", 1248", 1272", 1296", 1320", 1344", 1368", 1392", 1416", 1440", 1464", 1488", 1512", 1536", 1560", 1584", 1608", 1632", 1656", 1680", 1704", 1728", 1752", 1776", 1800", 1824", 1848", 1872", 1896", 1920", 1944", 1968", 1992", 2016", 2040", 2064", 2088", 2112", 2136", 2160", 2184", 2208", 2232", 2256", 2280", 2304", 2328", 2352", 2376", 2400", 2424", 2448", 2472", 2496", 2520", 2544", 2568", 2592", 2616", 2640", 2664", 2688", 2712", 2736", 2760", 2784", 2808", 2832", 2856", 2880", 2904", 2928", 2952", 2976", 3000", 3024", 3048", 3072", 3096", 3120", 3144", 3168", 3192", 3216", 3240", 3264", 3288", 3312", 3336", 3360", 3384", 3408", 3432", 3456", 3480", 3504", 3528", 3552", 3576", 3600", 3624", 3648", 3672", 3696", 3720", 3744", 3768", 3792", 3816", 3840", 3864", 3888", 3912", 3936", 3960", 3984", 4008", 4032", 4056", 4080", 4104", 4128", 4152", 4176", 4200", 4224", 4248", 4272", 4296", 4320", 4344", 4368", 4392", 4416", 4440", 4464", 4488", 4512", 4536", 4560", 4584", 4608", 4632", 4656", 4680", 4704", 4728", 4752", 4776", 4800", 4824", 4848", 4872", 4896", 4920", 4944", 4968", 4992", 5016", 5040", 5064", 5088", 5112", 5136", 5160", 5184", 5208", 5232", 5256", 5280", 5304", 5328", 5352", 5376", 5400", 5424", 5448", 5472", 5496", 5520, 5544, 5568, 5592, 5616, 5640, 5664, 5688, 5712, 5736, 5760, 5784, 5808, 5832, 5856, 5880, 5904, 5928, 5952, 5976, 6000, 6024, 6048, 6072, 6096, 6120, 6144, 6168, 6192, 6216, 6240, 6264, 6288, 6312, 6336, 6360, 6384, 6408, 6432, 6456, 6480, 6504, 6528, 6552, 6576, 6600, 6624, 6648, 6672, 6696, 6720, 6744, 6768, 6792, 6816, 6840, 6864, 6888, 6912, 6936, 6960, 6984, 7008, 7032, 7056, 7080, 7104, 7128, 7152, 7176, 7200, 7224, 7248, 7272, 7296, 7320, 7344, 7368, 7392, 7416, 7440, 7464, 7488, 7512, 7536, 7560, 7584, 7608, 7632, 7656, 7680, 7704, 7728, 7752, 7776, 7800, 7824, 7848, 7872, 7896, 7920, 7944, 7968, 7992, 8016, 8040, 8064, 8088, 8112, 8136, 8160, 8184, 8208, 8232, 8256, 8280, 8304, 8328, 8352, 8376, 8400, 8424, 8448, 8472, 8496, 8520, 8544, 8568, 8592, 8616, 8640, 8664, 8688, 8712, 8736, 8760, 8784, 8808, 8832, 8856, 8880, 8904, 8928, 8952, 8976, 9000, 9024, 9048, 9072, 9096, 9120, 9144, 9168, 9192, 9216, 9240, 9264, 9288, 9312, 9336, 9360, 9384, 9408, 9432, 9456, 9480, 9504, 9528, 9552, 9576, 9600, 9624, 9648, 9672, 9696, 9720, 9744, 9768, 9792, 9816, 9840, 9864, 9888, 9912, 9936, 9960, 9984, 10000.

**WRITE
FOR YOUR COPY
OF THIS
SERVICE HELP**

SERVICE is the eleventh bulletin. This is the service bulletin series published by Detroit Lubricator Company, a Lubricator Co. 8 1/2" x 11" are printed, punched, leaf paper, punched loose leaf standard copies may be binder on request. Write for yours.

THESE FEATURES OF "T

THESE
lift against high

POWERFUL—Ample power to lift a plunger and guide tube minimum.

Design of a - c h o m e

[illegible]

EASILY IN-SERVICE—Can be disconnected and reconnected without need for special tools.

EASILY cleaned without disassembling—Nonmagnetic assure safe use in magnetic fields. **COIL-ING**—"off" spring retained.

POSITIVE strong, and CLOSING on wiring. CLOSING 'kick' ties are of close-grained moisture-proof

LIVED—Valve bodies are of the seat and closing. Coils are of brass. Replacement

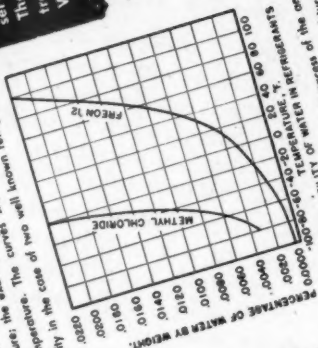
LONG-LIFE
non-porous cast die
construction. Draw
little current. Draw
expensive.

ECONOMICAL—Direct solenoid valves are inexpensive. "DL" solenoid valves are required for these features.

Specify the advantage of the ink.

No. 11 of a Series

Space the full text of this giving help on this page. The service is complete. Write for your copy.



Given on the chart will present a picture of the moisture content of the material. If the moisture content is high, the material will be dehydrated, and the moisture content will be reduced. If the moisture content is low, the material will be hydrated, and the moisture content will be increased. The moisture content of the material is a function of the temperature and the relative humidity of the air. The moisture content of the material is a function of the temperature and the relative humidity of the air. The moisture content of the material is a function of the temperature and the relative humidity of the air.

Moisture freezing at the expansion valve is more than in low temperature units. The dew point in high or medium air and the solubility of this liquid refrigerant are factors they must be maintained. An excessive amount of moisture in the system will lead to a better understanding of each of these factors follows and it is considered that this material will lead to a better understanding of the necessity for very careful dehydration of dry air and water vapor before entering the refrigeration system.

DETROIT LUBRICATOR COMPANY

General Offices: 5900 TRUMBULL AVENUE, DETROIT 8, MICHIGAN

Division of American Radiator & Standard Sanitary Corporation

DETROIT"

"Detroit" Heating and Refrigeration Controls • Engine Safety Controls • Safety Float Valves and Oil Burner Accessories • "Detroit" Expansion Valves and Refrigeration Accessories • Stationary and Locomotive Lubricators

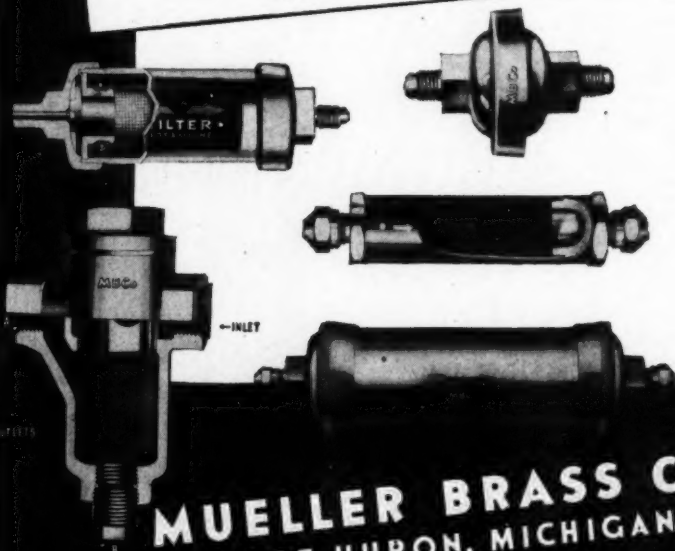
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All Filters and Strainers are designed to insure efficient passage to the maximum refrigerant volume that is generally used in any particular size refrigerant line. The range is exceptionally complete—one for every specific purpose.

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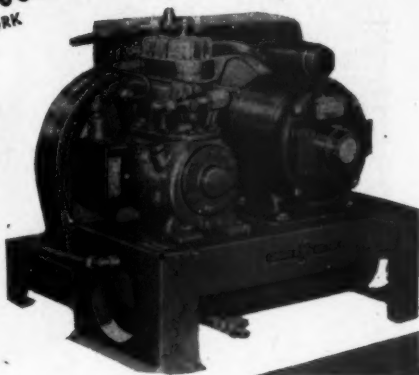
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PORT HURON, MICHIGAN

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PARTS IN THEIR
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UNITS



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TIME-TESTED PERFORMANCE

Mueller Brass Co. Valves, Fittings and Accessories for mechanical refrigeration have a well-earned reputation for built-in quality and time-tested performance. They are manufactured specifically for mechanical refrigeration work. THEY ARE USED BY ALL OF THE LARGEST MANUFACTURERS THROUGHOUT THE UNITED STATES. Mueller Brass Co. products must be good!

The condensing unit is the heart of the refrigeration system. It must operate dependably day in and day out to protect perishable foods—in stores, restaurants, hotels, hospitals, locker plants, on farms. A product of General Electric research and manufacture, the CM-43B condensing unit is designed for just this service—to give dependable, safe, and economical performance for many years.

G-E design means proper selection and application of many kinds of raw materials—co-ordinated engineering of compressor, condenser, motor and controls. G-E manufacture spells precision machining to close tolerances—advanced techniques in production—skilled painstaking workmanship, all important contributions to service life. G-E testing makes for dependability through hundreds of routine parts, tests and inspections—plus factory life and run-in tests—plus field tests.

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**Gives You Joints with
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This groove in Imperial Triple-Seal Flare Fittings brings you triple-seal tightness in every joint . . . an extra protection against leakage.

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TOOLS FOR CUTTING, FLARING, BENDING, COILING, PINCH-OFF AND SWEDGING



Your share of profits can have a direct relation to your share of Kold-Hold refrigeration units. When using Kold-Hold Serpentine Plates you have a share in Kold-Hold savings. You have fresh standards of efficiency and economy for new products for an expectant market.

This assures you these advantages: Maximum prime surface; highest rate of plate heat acceptance obtainable with natural convection lowsides; minimum pressure drop; freedom from oil logging because the refrigerant circulates freely from inlet to outlet; no chance for short circuiting of the refrigerant; maximum K factor. Locker plant owners are finding the plate stand units especially adaptable to the standard depth freezer cabinets.

Conversion of out-dated cabinets and coolers gives you more space, better cooling, and saves the high cost of new equipment. The Kold-Hold principle of refrigerant flow permits fabrication of Serpentine Plates into complete liners and shelves with all refrigerant joints eliminated and without interruption of flow.

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Write for information on sharing in Kold-Hold savings.

KOLD-HOLD

KOLD-HOLD MANUFACTURING COMPANY, 502 N. Grand Ave., Lansing 4, Mich.

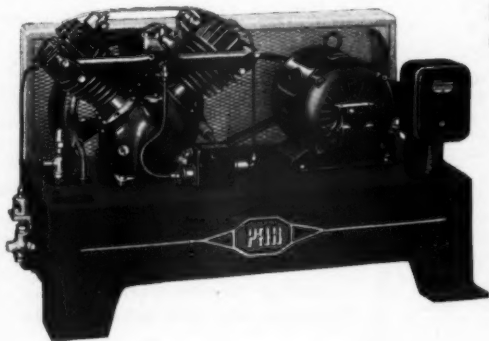
Balanced Performance

For more economical
more dependable REFRIGERATION
You can't beat **PAR**
air- and water-cooled models
From $\frac{1}{6}$ to 5 horsepower.

PAR BY *Lynch*



ON the job performance gives definite proof that for economical, dependable operation you can't beat Par. Par's many outstanding features give added efficiency, long life, and trouble free service.



See your Par wholesaler for complete details or write for Par Catalog R-97.

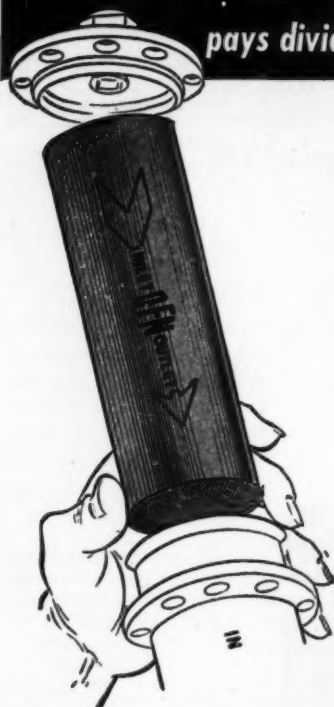
**PAR—Condensing Unit Line sold exclusively through
Franchised Refrigeration Equipment Wholesalers!**

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Manufacturing Corporation
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AVOID SUMMER SHUTDOWNS

due to Moisture . . . Sediment . . . Acid!

Extra capacity of DFN SYSTEM
pays dividends under hot weather loads



McINTIRE CONNECTOR CO.
255 Jefferson St.
Newark 5, New Jersey

Refrigeration shutdowns are bad at any time—but extremely costly in hot weather. Longer, more frequent runs of your compressor mean more chances for freeze-ups and clogging—unless you have the triple protection and extra capacity of the DFN system. With one unit, it dehydrates, filters and neutralizes. Its exclusive strainer-filter assembly holds more sediment without pressure drop, filters to minute size. Thus, the DFN System handles heavier loads, longer. Servicing the DFN system is easier, safer and takes only half the time. Simply open the flange, and replace the factory-packed, hermetically-sealed DFN cartridge. No danger of loose, non-uniform packing—no loss of dehydrating strength. Change to the DFN system now. Ask your distributor or write us for catalog R-7.

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MONEL BRASS BRONZE

Fabricated to specification for Refrigerants, Oils and Other Liquids.


Only the

DEHYDRATORS • STRAINERS



**DEHYDRATES
FILTERS
NEUTRALIZES**

FILTERS • NEUTRALIZERS



Interchangeable Capacity

THE NEW ALCO THERMO-LIMIT VALVE

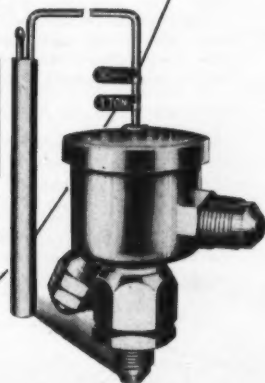
...4 different capacities from 1 versatile valve!

With the new ALCO THERMO-LIMIT Valve, it's easy to change capacity on the job—in just a few minutes. By merely inserting different cage assemblies, this one unique valve will give you four separate capacities:

Catalog Number	Nominal Capacity in Tons	
	"Freon-12"	Methyl Chloride
151	.25	.50
152	.50	1.00
153	1.00	2.00
154	1.50	3.00

The ALCO THERMO-LIMIT is a 'safety' valve that limits pressure to prevent motor overload. It is liquid charged for positive control in any location and position. Parts are interchangeable so that pressure, capacity and super-heat can be changed in the field.

Available at your wholesaler's for smaller capacity commercial refrigeration. Ask for our Bulletin 152.



Designers and Manufacturers
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Float Valves; Float Switches.

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With the complete line of Westinghouse Water Coolers, you can meet the requirements of all your customers. For Westinghouse builds bottle coolers, standard coolers and explosion-proof coolers—models for all kinds and types of applications . . . from the small office to the busy store or factory. They are designed with an eye to your merchandising problems . . . making easier your sales, installation and service.

Westinghouse Water Coolers are practical, efficient, low-cost equipment which will satisfy the buyer and lead to more sales.

These units are powered by the famous Westinghouse hermetically-sealed refrigeration unit . . . completely sealed against dirt and moisture. Years of research and development by Westinghouse engineers assure your customers a long period of economical, trouble-free service.

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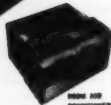
EASY TO APPLY—Complete factory-prepared application data and capacity tables provided to simplify your job.

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EASY TO SERVICE—Complete and detailed factory instructions specially developed for dealer servicing—hermetically-sealed construction simplifies replacement if necessary.

FOR DETAILS about the availability of these products write to Westinghouse, 653 Page Blvd., Springfield 2, Mass.

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SEARCH-IN REFRIGERATOR



COMPLETE MILK COOLER

Packaged Refrigeration by Westinghouse

WESTINGHOUSE ELECTRIC CORPORATION • REFRIGERATION SPECIALTIES DIVISION • SPRINGFIELD 2, MASS.



FREON Lab "M.P." guards against Corrosion, *Freeze-ups in Air Conditioning and Refrigerating Systems*

A new kind of "M.P.," a "Moisture Patrol," protects the long life and well-being of systems using "Freon" safe refrigerants.

The laboratory control test that is illustrated above proves the amazing *dryness* of "Freon"—gives hourly assurance during production that *there are no more than 25 parts of moisture in a million parts of "Freon."*

This test for moisture content is only one of the many tests that guarantee the purity of "Freon" safe refrigerants. Developed and produced specifically

for air conditioning and refrigeration, these refrigerants permit engineers to design compact, efficient, long-lasting equipment.

"Freon" safe refrigerants are non-flammable, non-toxic. Because they're pure—non-corrosive—they help keep maintenance costs down. For safety, efficiency, and long-range economy, use "Freon" safe refrigerants. Full technical data upon request. Kinetic Chemicals, Inc., 10th and Market Sts., Wilmington, Delaware.

..... **OUTSTANDING FEATURES OF "FREON" SAFE REFRIGERANTS**

1. Narrow boiling point range—confined within limits of $1/20^{\circ}\text{C}$.
 2. Low volume of insoluble gases—less than 2% in vapor phase.
 3. Freedom from acids—thorough tests prove there are no acids in "Freon" refrigerants.
 4. Freedom from impurities—high boiling impurities total less than $1/20$ of 1%.
 5. Freedom from moisture—tests prove there are no more than 25 parts moisture in a million parts of "Freon."
-



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FOUND IN THE CUTLER-HAMMER REFRIGERATION REPLACEMENT LINE

Sixty percent of all refrigeration control replacement requirements are met by one Cutler-Hammer control alone... the *Universal Replacement Unit*. And where specific control is needed, that need is met by Exact Replacement control items in the C-H line, each individually packed, clearly labelled, complete with dial plate mounting screws, trim washers and full instructions for mounting and adjustment.

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Bul. 9521N9 ➔

THIS ONE UNIVERSAL UNIT ALONE COVERS 60% OF ALL NEEDS

ADJUSTABLE MOUNTING BRACKETS

Maximum Mounting Centers 4-3/16

Minimum Mounting Centers 2-3/16

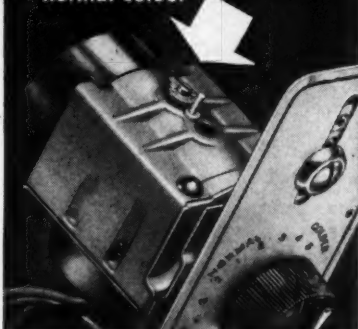
Adjustable Cutout Feature—Differential can be increased 4 degrees by turning indicator in "Hi" direction and decreased 4 degrees by turning in "Lo" direction.

Adjustable Range—Turning screw clockwise lowers setting and counter-clockwise raises settings.

Operating knob can be adjusted to meet various evaporator scale settings. New knob



4 degree external differential adjustment either side of normal cutout



is ideal for varying shield thicknesses. Makes this control adaptable to wider range of single dial replacement jobs where overload is not required in unit.



DOMESTIC, SEMI-COMMERCIAL AND COMMERCIAL CONTROL

WHEN SERVICE CALLS COME HOT AND HEAVY . . .



*Conveniently Warehoused
Competitively Priced*

What is so rare as a day in June . . . especially a day in June without a whole "heat-wave" of refrigeration service calls? That's why refrigeration service organizations turn for welcome relief to Kelvinator's 50 strategically located parts depots . . . where *complete stocks* of refrigeration parts and supplies are available at *competitive prices* . . . and fast delivery is possible in every locality.

NASH-KELVINATOR CORPORATION,
Detroit



Kelvinator



BUY KELVINATOR FOR ALL YOUR REFRIGERATION REQUIREMENTS



**KELVINATOR OFFERS VALUABLE
HELP FOR YOUR**

SERVICE TRAINING PROGRAM

For training additional personnel, refrigeration service organizations will welcome the valuable aid of Kelvinator's service training material. No. 1 on this hit parade of training helps is illustrated above—the 236-page "Simplified Training Course for Refrigerator Service Men." Ask your local Kelvinator Distributor or Zone Office about it.

CONDENSING UNITS

**REFRIGERATION PARTS
AND SUPPLIES**



4 PERFECT REASONS...

... why TEMPRITE will best fit your beverage cooling applications

EFFICIENT—Extremely small size with unusually large capacity. Will fit all fountains and beverage dispensers.

COMPLETE—Equipped with temperature control valve and refrigerant-feed valve. No extra valves to buy or install.

ACCURATE—Perfect temperature control at all times with Temprite's patented, pressure operated, control valve.

SAFE—Beverages flow through all stainless steel coils, no chance of metal contamination.

Competitively priced, these Temprite cooling units, especially designed for

soda fountains and beverage dispensing applications, offer to manufacturers and distributors the ultimate in quality, performance, and service free operation.

Write today for new literature
and specifications.



A model available
for every application.
Will cool 1, 2, or 3
different beverages
as desired

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UNDERWRITER'S
LABORATORIES

TEMPRITE PRODUCTS CORP.

Originators of Instantaneous



Liquid Cooling Devices

45 PIQUETTE AVENUE

DETROIT 2, MICHIGAN



**Success... fitting diadem
for superior performance**

Insure yours by installing Mills Compressors and Condensing Units.

MILLS INDUSTRIES, INCORPORATED - REFRIGERATION DIVISION



4100 FULLERTON AVE. • CHICAGO 39, ILLINOIS

SERVICE ENGINEER

17

June, 1946

Brunner Refrigeration helps you serve better

IF COMPRESSOR LOSES ITS OIL

The Brunner Refrigeration Service Manual gives the following possible causes and remedies:

PROBABLE CAUSE

Lack of refrigerant:

Improper evaporation design:

Carrying too high a superheat at compressor suction:

Compressor operating too fast:

Short cycling:

Clogged expansion valve or strainer:

Insufficient oil-gas ratio charged into system:

Traps in the suction piping or condensing unit too high above the evaporator:

TEST and REMEDY

Locate leak and recharge.

Too low a gas velocity through the evaporator. Should not be less than 1200 feet per minute.

Relocate bulb of expansion valve or adjust liquid-feed to return wet gas to compressor.

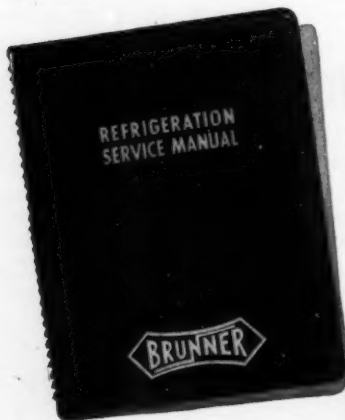
Return compressor speed to factory recommendation.

See observation B.

Clean or replace.

Add oil to crankcase.

Drain return tubing toward compressor. Loop tubing every 10 feet of vertical rise.



FUNDAMENTALS that apply only to Brunner Condensing Units? Of course not. They are common to all refrigeration systems and are emphasized in the Brunner Service Manual. That's why you should not be without a copy where troubleshooting. We'll send you a copy for only \$2.50. Write to:



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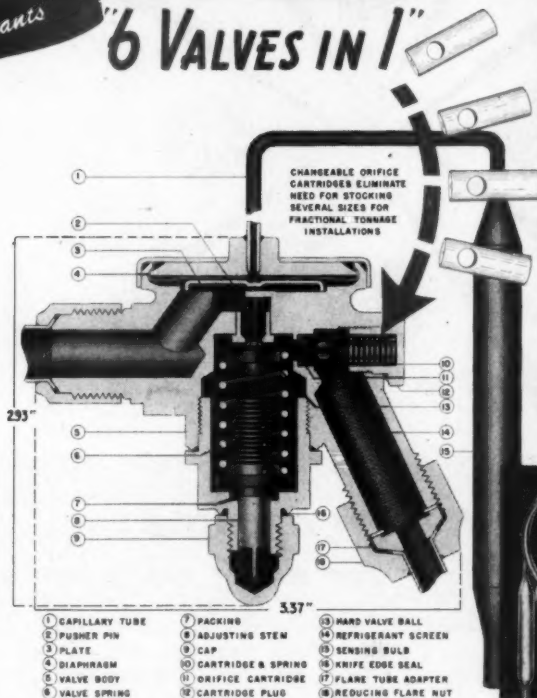
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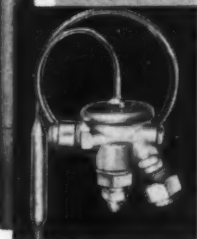
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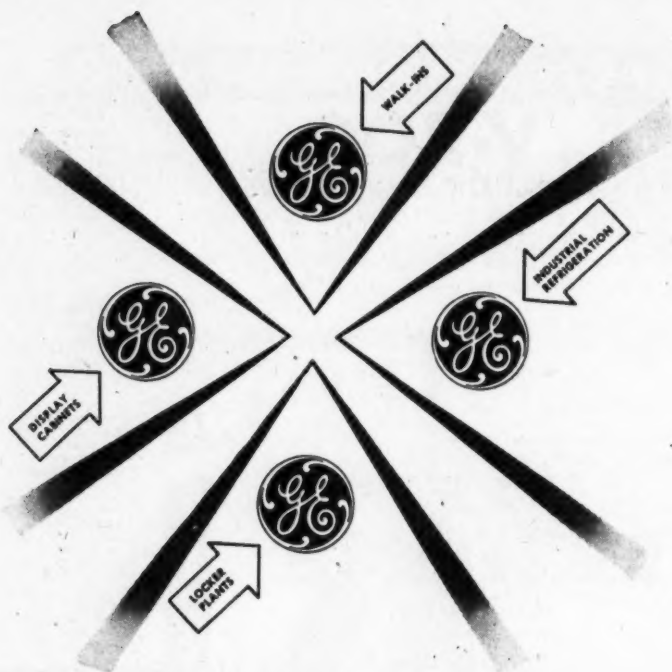
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	FREON			METHYL CH			SULPHUR D		
	CAT NO. 354121			CAT NO. 354122			CAT NO. 354123		
	V-200-1			V-200-1			V-200-1		
	STU/IN. TONS	STU/IN. TONS	STU/IN. TONS	STU/IN. TONS	STU/IN. TONS	STU/IN. TONS	STU/IN. TONS	STU/IN. TONS	STU/IN. TONS
8500-015	1200	10	2400	20	2400	20	2400	20	
8500-018	2400	20	4800	40	4800	40	4800	40	
8500-024	3600	30	7200	60	7200	60	7200	60	
8500-035	6000	50	12000	100	12000	100	12000	100	
8500-050	9000	75	18000	150	18000	150	18000	150	
V-200-100, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600, 650, 700, 750, 800, 850, 900, 950, 1000	12000	100	24000	200	24000	200	24000	200	



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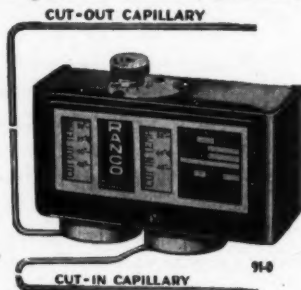
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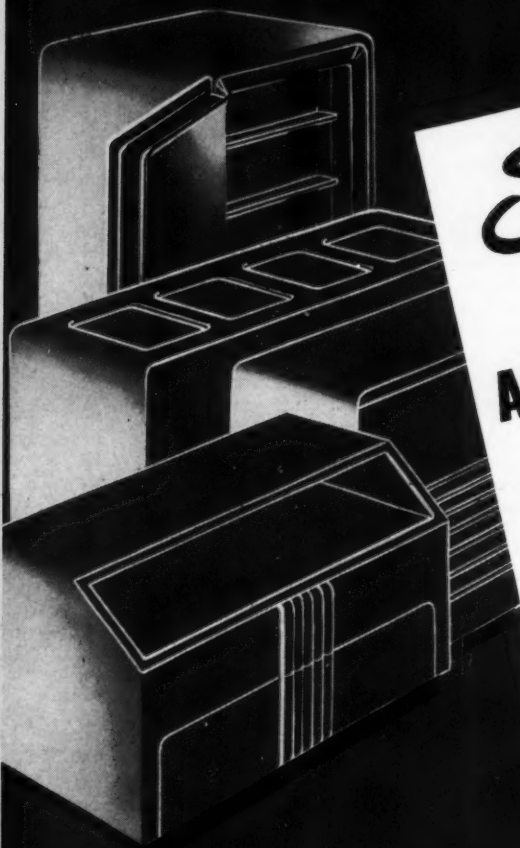
JUNE, 1946

No. 6

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IN THIS ISSUE—

The service field has always known that the corner drug store should have refrigeration in its prescription department, but efforts at selling the druggist on such needs are usually met with the statement, "I keep my perishables in the soda fountain." The salesman of refrigeration seldom has more than a speaking acquaintance with pharmaceuticals and he is therefore compelled to let it go at that. An article on page 29 by Louise Bruner under the heading of "Drug Stores Offer Big Market for Refrigeration" should change all that, because it puts in the hands of the salesmen the selling information he needs. There are many items on the shelves of the drug store which should be in a refrigerator.

The sale and service of food machines is a natural companion for commercial refrigeration as proven by an enterprising service firm in Dayton, Ohio. The combination places the firm in the position of offering a complete service to the butcher, the delicatessen, the baker or any other food merchant on all his mechanical needs. The story on page 32 by Stephen Porter Lathrop describes the firm offering this type of service.

The refrigeration service field is growing up. It is rapidly becoming big business. But as it grows it becomes more competitive and there is a tendency toward more specialization. Costs must be analyzed more closely and more attention must be paid to the business end of the operation. Knowing the need of more discussion on the business aspects of the game we introduce on page 34 of this issue a new author, Waylan Clarke, and his new column "Getting Down to Business." This column will be a regular monthly feature discussing in a lively easy-to-read manner the business end of the service business. This first column, while largely introductory, provides some general suggestions for successful dealing with the public and an acid test to which you can put yourself.

The City of Los Angeles has had a code governing the installation and service of refrigerating equipment for a number of years, but some provisions in it have been found unsatisfactory and a change desirable. It has required nearly three years of work to perfect the changes, but it is now complete. A summary of the changes made appear on page 36.

The characteristics of the motor starting capacitor, their purpose and methods of determining the proper capacity needed for replacement, both by the use of mathematical calculations or by testing with the necessary instruments, is discussed by Louis Kahn on pages 37 to 43. It is a highly informative article on the subject, worthy of careful study.

We have heard of complaints of bad odors caused by door gaskets, insulation, varnish and other things, all of which created odors in the refrigerator. An odor, strong enough to cause a complaint, from compressor gaskets, however, is very uncommon, yet that was the experience of one serviceman who writes in the Service Pointers column of this issue on page 44.

Because of the huge demand at the present time for manufactured goods, many men in the service field are inclined to think that the development of a sales business is of more importance than service, and are wondering if they should concentrate on sales in preference to service. The Editor of the Question Box, appearing on page 46, disagrees with this thought and tells the reasons why in reply to a question.

Under the heading of "Government Bureaus—News and Rulings" on page 52, is some welcome news to the service field. Along with advancing prices for labor and materials in every line of work these days, the service firm is now permitted to increase his service rates to compensate for higher wages paid servicemen. He is also permitted to pass on to his customer the increased cost of parts he purchases.

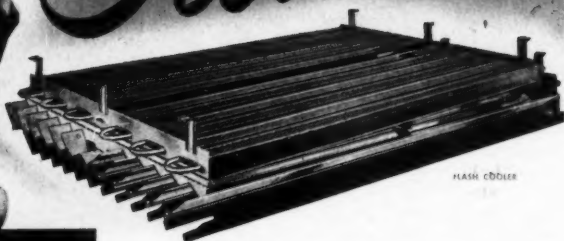
Items contained in "New and Improved Appliances" on page 74 reflect an increase in the number of replacement parts for hermetic units being manufactured.

COVER

OUR front cover this month is a view of the refrigerator used in the pharmacy of the Huron Road Hospital in Cleveland, Ohio. The article entitled "Drug Stores Offer Big Market for Refrigeration" on page 29 describes its need in the preserving of pharmaceuticals.

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June, 1946

28

THE REFRIGERATION

Drug Stores Offer Big Market for Refrigeration

Refrigeration for the drug store is a relatively untouched field. This insight into the problems of the druggist, in handling temperamental drugs, will help sell him the refrigeration equipment he needs.

By LOUISE BRUNER

IF THE refrigeration industry will step forward with a blue print for pharmacists, showing them how low temperatures will preserve perishable drugs, it will open a fertile market.

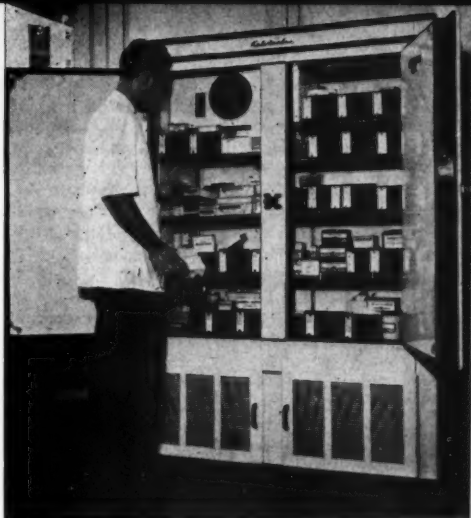
At present, many of the 50,000 retail drug stores do not provide enough refrigerator space to accommodate all the products that are benefited by chilling, nor are they able to maintain the wide range of temperatures to meet the specific requirements of certain drugs.

Progressive druggists all over the country are showing that adequate refrigeration not only pays for itself in a short time in increased prescription business, but also builds good will by inspiring public confidence in their professional integrity.

Take A. F. Zimdahl, of Buffalo, N. Y., for example. Instead of delegating his prescription department to the customary back room, he features it, by turning over the front of his store to this department, where his special refrigerator is in full view of every passer-by.

People who were at first curious at this innovation came in to find out more about it. When Mr. Zimdahl explained the precautions he was taking to insure full potency of the drugs he dispensed, they resolved to bring their prescription business to him.

"I have already realized a profit on my investment of \$900 for the refrigerator, and



Pharmacy in Rudd's Drug Store, Cleveland, located in the Osborn Bldg., which serves many doctor's offices.

the expressions of confidence and compliments will mean more dollars and cents in the future," he says.

"I am now able to carry a host of products which I was formerly not able to stock, and consequently I can fill prescriptions I would otherwise have to turn away. My loss by spoilage has been markedly reduced because I can now preserve my perishable items. In my opinion, sufficient and proper refrigeration is a definite must for every pharmacy."

A Sales Opportunity

It is an opportunity for the refrigeration engineer to make use of such experiences as Mr. Zimdahl's by demonstrating to other pharmacists how they, too, can use refrigeration to serve their customers better and also increase their profits.

A convincing talking point in establishing this new market is provided by Dr. Arthur Wyss, dean of the School of Pharmacy, Western Reserve University, Cleveland. He warns, "Penicillin and many other important pharmaceuticals deteriorate if not kept in the refrigerator."

"Many people are taking injections, swallowing pills and rubbing themselves with ointments which do not accomplish the results intended because improper storage has permitted chemical changes and loss of strength to take place," he continued.

"The development of new products and increasing knowledge of some of the old drugs in common use make the need for refrigeration in the field of pharmacy increasingly urgent."

Quoting from the United States Pharmacopeia and the National Formulary, which are the apothecaries' bibles, Dr. Wyss lists the following products as examples in which refrigeration is essential to insure full potency: insulin, liver B-vitamins injection, synthetic vitamin D (viosterol in oil), such biologicals as diphtheria, scarlet fever, streptococcus, and tetanus antitoxins, and rabies, typhoid, typhoid-paratyphoid and small pox vaccines, fluid extract of ergot and ephedrine alkaloid.

Experimental evidence has shown that vitamin B solutions and penicillin preparations should be stored in a cold place. There are many other products on the list, which if not so urgent, benefit greatly from storing at low temperatures.

Installation of refrigeration in the prescription department is not an arbitrary matter like adding streamlined showcases or fluorescent lighting. It is an evidence of the pharmacist's intention to live up to the public trust placed in him.

Public Depends on Druggist

No layman can memorize the entire list of medicines in the druggists' stock that need refrigeration and the temperature they require. He must choose a pharmacist in whom he has confidence, and depend on him to provide whatever safeguards are needed. The druggist who invests in adequate refrigeration for his prescription items offers tangible evidence to his clients that he is qualified to serve them.

Take fluid extract of ergot as a case in point. This is prepared from the fungus-like growth on the rye plant, and is used for contracting the blood vessels in the uterus in the last stages of labor to guard against hemorrhage.

The average druggist has relatively few calls for this product, but when the call does come, a human life is at stake. It is his responsibility to make sure that ergot he passes over the counter will do the job expected of it.

Heat, age and exposure to air are proven enemies of this valuable medicine. But two studies in professional pharmacy journals show that while ergot deteriorates 70 percent in eight months under ordinary conditions of storage, the potency loss is reduced

to 12 percent in the same interval, if it is kept at 38° F.

The wonder drug, penicillin, is now being produced in large enough quantities so that it can now be used for the public instead of being reserved for military use exclusively. Calls for it will become increasingly frequent.

During the process of manufacture, conditions of sterility similar to those of the operating room are maintained. Violet ray lights shine on laboratory workers, and sterile air is pumped in, so that no air borne mold will contaminate the precious substance. It requires a temperature of 32 to 41° F to preserve it properly. Again, the pharmacist has a part to play in the miracles performed by this drug by maintaining it at this temperature while in his store, and by dispensing it in sterile containers.

Temperatures Required

"Most of the biologicals previously mentioned are best kept at a range from 36 to 50° F, while the ceiling temperature for smallpox vaccine and penicillin is 41° F. This shows why the average soda fountain refrigerator, with a uniform temperature, is not suitable for the requirements of prescription items."

Dr. Wyss offers another example. Ointments, with a vegetable oil or animal fat base may either separate at this low temperature or become too stiff to mix easily with other ingredients.

"Cold cream, made according to the U.S.P. formula, has an almond oil base, plus 20 percent distilled water and rosewater. When stored at too low a temperature, there is danger of a separation of the water from the solids just as mayonnaise does when it is frozen," he continued.

"Yet at room temperature, this product becomes rancid more quickly and irritating acids develop. It does not require a specialist to foresee the painful effects which may result if an irritating acid ointment is used on a tender skin ailment. From 59 to 68° F is the recommended temperature for storing such items.

The soda fountain refrigerator is inadequate on still another count—insufficient space.

The pharmacists' stock includes many substances that are highly volatile, and may be lost through evaporation as in the case of perfume when left uncorked. Chilling does not completely eliminate this, but does retard it, and that advantage should not

be overlooked. Therefore his refrigerator should be large enough to accommodate these items, many of which come in gallon sized containers.

In the case of a certain widely used cough syrup containing chloroform, it is common practice to buy it by the gallon, and dispense it in small bottles. Chloroform is extremely volatile, but also essential, for it quiets the patient, and lessens the tendency to cough.

Each time the stock bottle is opened, some of the precious substance escapes. By the time it has been tapped 18 or 20 times, there is little chloroform left in the last portion. Constant storage in the refrigerator would greatly reduce the loss of this volatile ingredient.

Oil of cloves, oil of cardamon, oil of caraway, camphor, menthol, paradichloridbenzene (moth crystals), and sweet spirits of nitre are other highly volatile products stocked by every drug store, which may be kept cold to advantage.

Another group of products which suffer great shrinkage through evaporation are ether, acetone, petroleum ether and benzene products. Again, chilling does not prevent loss if there is exposure to the air, but does lessen it. It also reduces the danger of fire and explosion among these inflammable substances.

The palatability of other preparations is improved by chilling. Among these are cod liver oil and the laxative, citrate of magnesia.

Experience Shows It Pays

The question arises as to whether it would be profitable for the neighborhood druggist to invest in special prescription refrigerator equipment. Maybe there are not enough calls for these temperamental items to justify the investment. Maybe he should dispense only those drugs which do not need specialized refrigeration, and leave the perishable items for the down town pharmacists or those located in doctors' office buildings.

Actual experience of the alert pharmacists, who have pioneered with prescription refrigeration equipment, proves otherwise. They find their investment is highly desirable and profitable.

Owners of establishments located in outlying residential areas and in small towns have found that their reputations for compounding accurate and potent prescriptions spread, and their business is coming from all over the city, instead of only from their immediate neighborhood.

The public is vitally interested in anything that has to do with improving health, and their knowledge of vitamins, sulpha drugs and penicillin is increasing. As the news percolates that some drugs are as perishable as meat and milk and may not produce results if deterioration has occurred, they will demand that their pharmacist prove his fitness to handle their prescription business. And certainly a refrigerator for storing drugs is one of the pharmacist's most convincing talking points.

However, the entire responsibility for the proper dispensing of drugs is not with the retail druggist alone, and hence the market for drug refrigeration is not limited to him.

Doctors and Clinics Are Prospects

Many doctors dispense drugs from their offices, which rarely have refrigeration facilities. Too often their medicines are kept in an overheated drug closet. Many of them would welcome the presence of a pharmacist in their building or nearby, who would store their perishable preparations and deliver them when needed. They would certainly recommend such a pharmacist to their patients, for then they would be assured that the medicines they prescribe would be dispensed in full potency.

Clinics in public schools, factories and hospitals often handle drugs which need refrigeration, even when they have no equipment for properly storing them.

The detail man from the pharmaceutical and drug wholesale houses must advise his customers of the refrigeration requirements of any product he handles. The better known pharmaceutical houses state refrigeration requirements on their labels. But some are guilty of omitting these instructions so as not to lose a sale from a well intentioned pharmacist, who lacks proper refrigeration, and who would refuse to stock a product he could not adequately protect.

In many of the retail drug stores and wholesale houses a limited amount of refrigeration is already in use. But adequate refrigeration needs for modern professional pharmaceutical practice demands a greater area of refrigerated space, as well as adequate areas which may be maintained within certain ranges of temperature at distinctly different levels.

Here is an opportunity for the refrigeration industry to serve the public and the profession, and to reap the profitable rewards of their enterprise.

Food Machines Proves Good Companion For Refrigeration

By STEPHEN PORTER LATHROP

TWENTY-THREE years ago, in 1923 a man by the name of W. B. Haines started out in business in Dayton, Ohio, all by himself and in a most modest way selling food machines such as mixers, choppers, scales and the like. He was not selling these to the public but rather to food stores. The start was very modest indeed but Mr. Haines had in the back of his head an idea that wasn't quite so modest. In the twenty-three years since this one man business was started, he has achieved a considerable portion of his big idea with which he started in business. W. B. Haines, Food Machines as well as Home Makers, Inc. have been born.

The business of selling food machines to retail stores, markets and restaurants prospered under Mr. Haines personal urge and after a time he added a salesman and also a service man, the latter to service the machines that he sold and that the new salesman sold.

Added Refrigeration 10 Years Ago

For thirteen years the business was confined to food machines with business improving year by year despite the toughness of some of those years because of the crisis that started with 1929.

In 1936 the business really got going with the addition of a commercial refrigeration sales and service department to the already flourishing food machine business. Other food machines were taken on and a slogan adopted that pretty well classified the business. This slogan runs "All Types of Equipment for the Preparation, Storage and Merchandising of Food."

The main office of this firm is located in Dayton at 622 South Main Street. In addition the firm has a branch office in Lima, Ohio, Richmond, Ind. and also at Springfield, Ohio. All three of these branch offices are devoted to both sales and service of the

full line of food machines including refrigeration. Like in Dayton, however, the business is strictly commercial no sales being made to the public or homes.

In addition to this business in food machines including refrigeration for commercial use, the firm has, during the past year been building up distributorships for various equipment, chiefly condenser units, low temperature equipment, farm refrigeration, milk coolers and some domestic appliances. This new venture is going forward today with the prospect that additional lines will be taken on as post war production gets under way and distributorships become available for the territory served by this firm.

Mr. Haines is a firm believer in advertising, in all forms of advertising, with the result that W. B. Haines, Food Machines uses local newspaper advertising, radio, circulars for direct mailing and billboards. A total of seven large billboards cover every main road leading into and out of Dayton, advertising the entire line of food machines.

Mailing List Maintained

The direct by mail list maintained by this firm contains over 5,000 customers names. To keep the mailing list up to date and to add new names to it, the local Court Record, a publication in Dayton, is carefully checked for names of firms to whom competitors have sold equipment on the installment basis, such data being published in this record. If the names of such purchasers are not on this firm's mailing list then the name is immediately added to it for future mailings in the hopes of getting some of the business. Another source of new names is the report of the local credit rating bureau that issues a weekly list of new businesses started in Dayton. These names, if they represent firms using food machines are added to the mailing list.

The bid for business, however, doesn't stop with putting the new names on the mailing list. A notation of all such new names is made according to the territory in which they are located and these lists are given to the salesmen covering that territory. Each salesman then calls on the prospect and acquaints him with the house of W. B. Haines, Food Machines.



W. B. Haines, center, owner and operator of Food Machines and Home Makers, Inc.

Besides this advertising the firm uses the telephone directory in each of the towns and cities served by the firm which includes a territory of twenty-seven counties, some in Ohio and some in Indiana.

A force of sixteen salesmen are employed, these sixteen working exclusively on sales and covering the entire twenty-seven counties. These salesmen work on a commission basis, being paid a percentage of the gross profit resulting from each sale made. There is no fixed percentage that is paid that applies to all of the lines handled.

A force of a total of twenty-three service men take care of the servicing of the equipment sold by this firm. Of this number, one service man is permanently stationed in the Lima, Ohio office to handle the service jobs there. Servicing for jobs sold in the Springfield, Ohio and Richmond, Ind. portion of the territory is done from the Dayton office.

All service is under the direction of a general service manager who is stationed permanently in Dayton. He routes the men and attends to all detail of the service work. He has under his supervision an installation manager and also a parts and repair shop manager. The installation manager goes out on the road, with his installation crew, covering the installation of equipment in all of the twenty-seven counties. The

parts and repair shop manager remains in Dayton and is in charge of parts and the repair shop.

Service calls as they come into the office are entered on the usual service form which is in triplicate. The original and the duplicate of this form goes to the service man who gets the call. If the job is paid for on completion, the service man signs the original and gives it to the customer as receipt for the money paid. If the job is not paid for when completed, then the customer signs this original as indicating that the service call was made and the necessary work completed. The service man then brings this signed original back to the office where it goes to the accounting department for their use in billing. The triplicate which has been retained in the office together with the duplicate which the service man returns when the job is completed are sent to the accounting department also for checking one against the other to make certain that the job as ordered was done.

The firm maintains a fixed service charge rate, the first hour being charged at the rate of \$2.50 with this being a minimum charge. All time thereafter is on the basis of \$2.00 for each additional hour.

In addition the firm does considerable service work on a yearly contract basis with



Part of the Food Machines organization in front of their headquarters

quarterly inspections which includes lubrication, inspection as to running efficiency and minor repairs. On all minor repairs the customer is charged for parts used.

The service men work on an hourly scale, being paid union wages and guaranteed year round employment.

The shop is equipped with spray booth for painting and enamelling, and has mod-

(Continued on page 58)



By WAYLAN CLARKE

This is the first of a series of articles to appear under this heading on the business aspects of the refrigeration service business. The author, whose personal introduction to the series follows, is well qualified to discuss the subject. With a background of experience in refrigeration service work, instructor in one of our leading universities and in advertising work, he is now in a position which brings him in constant touch with refrigeration servicemen.

There are some independent refrigeration service engineers who go through life operating their shops on a "catch-as-catch-can" basis—small operators who will never become big operators because they would rather look into the business end of a gun held by a jittery trigger man than they would into the business end of their own businesses. Maybe these fellows got the way they are because, way back in grammar school, they were expelled by their arithmetic teacher for shooting paper wads. Or maybe they were afraid of being called bookworms and have shied away from any kind of book ever since.

Regardless of the reason (and some of them don't have any reason), they might as well give up whatever dreams they may entertain about becoming big operators unless they start getting down to business.

On the other hand, there are a good many small and middle-size operators who realize that running a service shop IS a business and it means sacrificing a little time to keep the necessary books, dusting their brains occasionally, putting on a clean shirt now and then, and using a pencil instead of chewing on it. These fellows are looking for suggestions about building the business ends of

their shops. To this large, ambitious latter group this column is dedicated but by no means restricted. If some of the "catch-as-catch-can" service shop owners find the spark in this column which will ignite their business sense—then more power to them! With this preamble, we launch "Getting Down To Business."—W. C.

AS A well-qualified, experienced independent refrigeration service man, you probably know your way around the best (or worst) of refrigerators—domestic and commercial. If you didn't, you wouldn't be independent very long, nor would you be a service engineer. You probably feel right at home with Oscar, the butcher's wobbly walk-in box or Mrs. Donovan's dyspeptic 12-year old domestic unit. But, as a good starting point in this business of getting down to business, have you ever considered doing an occasional service job—even a repair job—on yourself? In other words, are you developing the personal qualities it takes to become a "big operator"? Or haven't you checked up lately to see whether or not you need a personality overhaul?

Knowing your way around people—your customers, your suppliers, your fellow-tradesmen—that's just as important as knowing your way around a refrigerator. The way you "brush" people, assuming that you give them as good service as anybody else in the trade, is often the deciding factor in the way your business goes.

Smile—Don't Bark

You don't have to be a "life-of-the-party" type. You don't have to roar at grocer Joe Smith's "wise" cracks or be a rapidfire gag man with a clever remark for every occasion. Nor does every service call you make have to take on the aspects of a funeral. But it does pay off to wear a smile in your dealings with people, whether you like them personally or not.



Good business, too, requires you to keep a level head no matter how much you'd enjoy throwing a compressor at Mrs. Green who has cost you three callbacks because she always forgets to close her refrigerator. Here's the point: If there has to be any barking at your cus-

tomers or suppliers, let your dog do it—they'll expect it of the dog, most likely, but not of you!

You may be an isolationist or an interventionist, politically speaking. That's your business. But for heaven's sake, don't become an isolationist in your shop—the kind of a fellow who walls himself up in his shop day after day, night after night. You might be able to improve the quality of your work, but the quantity is sure to suffer. Put as much time as you can into getting around among people. Cultivating friends and taking the time to get acquainted with folks will give you a better insight into what makes people tick—or fail to tick. And don't overlook the fact that some day you may be doing a little sales work along with your service. That's when earlier contacts will count even more.

Learn from Successful Men

If you know of any successful business men in your community, and who doesn't, it's smart business to put real "oomph" into cultivating them. They may not be able to do you any good directly, but the fact that others know you are acquainted with them might build up your own stature in the community. There's another angle, too: successful business men are good objects for study. Watch their mannerisms, learn all you can from them—and don't overlook the fact that they are learning things from you. That's one of the reasons they are big business operators.

Finally, put yourself to this little "acid" test. If you can answer "YES" to all of the following questions, brother, you are on the way to becoming a "big operator"—if you aren't already there! If you can't answer "YES" to some of them, then take the "No's" and go to work on them until you can say "YES" and mean it! About that time you might let me know, for I'll be interested in taking stock in your company. Here they are:

1. Do you admit to yourself that you don't know all the answers?

2. Do you take time out from your work long enough to take the wife and youngsters out occasionally? (Answer "No" if you are a Sunday-only man.)

3. Do you get an average of seven to eight hours of sleep a night?



4. Do you get the license plates for your car (in normal times) before the local constabulary is ordered to issue tickets to hurry you up?

5. Do you keep personalities out of it when you go about collecting on unpaid bills?

6. Do you make ANY attempt whatsoever to collect on unpaid bills?

7. Do you handle service jobs for what you know to be easy-going customers as promptly as you do for the fussy ones?

8. Can you make yourself feel at home among strangers?

9. Do you accept suggestions from anyone (your wife, included)?

10. Do you read the newspapers, popular magazines, and/or listen to the radio? (Answer "YES" if two of the three are in the affirmative; "NO" if only one is in the affirmative.)

11. Are you willing to do a recall job free of charge if you, and only you, know that the mistake was strictly yours on the first trip?

12. Are you willing to take the time to wash up, put on clean clothes, if you need them, to make a service call?

13. Do you let the other fellow do a little talking now and then, regardless of the subject?

14. Can you accept excuses as easily as you can make them?

15. If you have read through and thought through every one one of these questions, give yourself a "YES" for the effort.

Parting thought: The "U" (you) comes before the "I" in *Business*. Spell the word out yourself. If you spell it out often enough, you may come to the realization that it also spells *Success* with a capital "S"!

SERVICEMEN AND COMPANIES

EDWIN H. TURPIN has been named manager of the service and installation department of the O. B. Kennedy Refrigeration Co., 1018 South Lamar, Dallas, Tex.

THE CARNATION COMPANY has published a certificate that it is conducting business under the firm name of Rush Refrigeration Corp., at 1119 South Victory Blvd., Burbank, Calif.

A. E. KAISER has opened a new supply house of parts and supplies for refrigeration service engineers, to be known as Acme Refrigeration Service, 1670 North Street, Baton Rouge, La.

NEW LOS ANGELES CODE COMPLETE

A NEW Los Angeles municipal refrigeration code, designed primarily to replace the city's original refrigeration code requirements which were scattered throughout the old building code and were rescinded along with that code on January 1, 1943, has been completed after nearly three years' work.

Since that date the city has had an interim code which contained a few general requirements but has proven unsatisfactory in many respects, particularly because its provisions are subject to numerous interpretations.

The present code, which was developed after scores of conferences and hearings at which representatives of practical refrigeration engineering groups, service engineering associations and others contributed suggestions, was to be presented in final form for adoption by the city council in June. Throughout, this code specifies the requirements and specifications of recognized national and U. S. government standards, except where it was evident that such standards could not plausibly be applied to local conditions.

Analysis of Code

In presenting an analysis of the code at a recent meeting of Los Angeles Chapter, National Association of Practical Refrigeration Engineers, Regis Gubser of the California Consumers Corp. declared that the code, as now set up, "is rather hard on ammonia installations in markets and similar establishments, but otherwise its provisions seem to have been dictated by practical procedure throughout." Gubser declared that the new code is more severe than the former regulations but is eminently fair throughout.

The new code is designed to serve as Chapter 9, Article 5, Division C, Parts 40 to 54, of the general municipal code.

Notable among the new code's provisions is Part 43, wherein it is specified that every person engaging in the business of refrigeration contractor in the city must obtain a certificate of registration from the Department of Building and Safety and pay an initial registration fee of \$50, with the annual renewal fee set at \$25.

This part of the code also provides that every person applying for such registration shall pass an examination to determine whether he has sufficient knowledge of the

theory and practice of the refrigeration contracting business and trade, to engage in such activities without jeopardizing the public safety. The code provides for an examination fee of \$5.00. Under this provision, every contractor will have to be certificated and at least one member of his staff will be obliged to pass an examination to prove his ability as a refrigeration journeyman.

Part 40 applies to the erection, installation, alteration, repair and servicing of refrigerating systems. It does not, however, include portable unit refrigerators of less than 16 cubic feet capacity. Refrigeration equipment installed prior to the effective date of the code is exempted, provided the equipment meets standards of safety.

Part 40 also provides for reconsideration annually of any desired amendments or revisions to the code.

Permit Fee Changed

Part 41 contains the permit fee schedule. This schedule differs from that of the old code in that a \$1.00 fee is charged for each refrigerant compressor and no fee is specified for each refrigerator. The change was made, it was reported, to simplify the computation of permit fees.

Part 42 defines the provisions for inspection and condemnation of unsafe refrigeration equipment.

Part 43 specifies the refrigerants approved for use in the city and sets up three classes of refrigerants based upon their relative safety as established by nationally recognized standards.

Part 46 pertains to the location of refrigerating equipment in buildings; and specifies the limiting amount of refrigerant permitted in the system in various types of occupancies, such as public assembly, stores and offices, schools and institutional buildings, apartment houses and hotels.

Part 47 specifies the construction of the refrigeration machinery room for plants containing more than 100 pounds of refrigerant. This part also specifies the area of such rooms, exits and working space around the equipment.

Part 48 pertains to construction and installation of refrigerant piping, containers, and valves, based upon the latest American Standards Association specifications. This part also states that refrigerant containers shall comply with the rules of the Unfired Pressure Vessel section of the A.S.M.E. Boiler Construction Code.

(Continued on page 58)

The Replacement of Electrolytic Motor Starting Capacitors

By LOUIS KAHN *

ELECTRIC motor driven equipment is usually powered by single phase fractional horse power alternating current motors. The development and perfection of economical high capacity electrolytic AC capacitors has made possible the practical use of electrically efficient high starting torque capacitor motors.

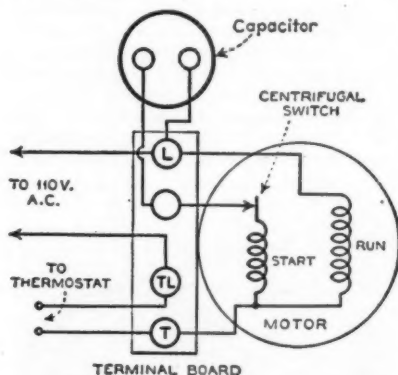


Fig. 1. The capacitor is connected in series with the starting winding and the centrifugally operated switch in the motor. In motors having a four terminal board the capacitor is connected between the terminal marked L and the unmarked terminal which is connected to the internal switch. For motors with a three terminal board separate leads are brought out for the capacitor. The capacity of the replacement capacitor may exceed the capacity of the original unit, but should not be any smaller than it.

The capacity used for any motor is chosen to give the maximum starting torque. This is determined by the motor manufacturer. In the field, when the replacement of the capacitor is necessary, the replacement unit should have the same capacity as the original unit. If the identification marks on the original unit are lost, the serviceman must

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So often when it becomes necessary to replace capacitors, no identifying marks can be found which would determine the exact replacement. This article provides a better understanding of capacitors, their purpose, limitations and method of calculating the size needed.

determine the proper sized unit to be used.

The circuit diagram of a typical capacitor-start single-phase induction motor is shown in Fig. 1. The purpose of the capacitor is to produce a current in the starting winding which will produce a magnetic field that will combine with the main winding and produce a high starting torque. The current that flows in the starting winding is determined by the voltage of the line and the design of the starting winding.

If various sized capacitors are used on a motor and the starting torque and voltage across the capacitor are measured, a curve

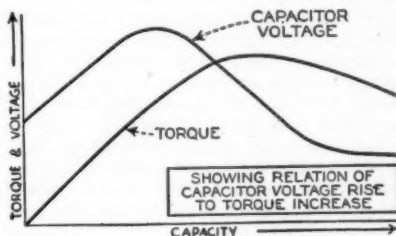
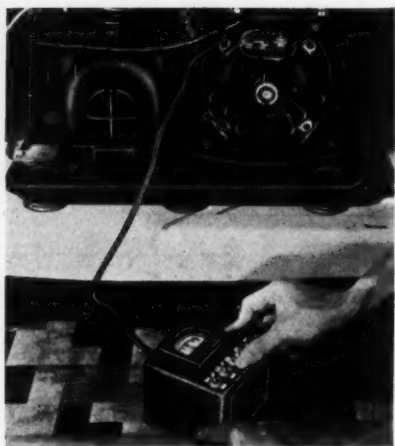


Fig. 2.

similar to that of Fig. 2 is obtained. The torque rises rapidly, and, after reaching its maximum value, slowly decreases. In the vicinity of the maximum value a fairly large change in capacity produces a relatively small change in torque. This is advantageous, as the relatively wide tolerance in the capacity of the capacitor keeps the cost of



When you are out on the job, determining the right size replacement capacitor is not always easy. The quickest, surest way is by applying the capacitor selector as the serviceman in this illustration is doing. He is trying various capacity values by flipping toggle switches while seeing that the voltmeter stays below the 138 volt crucial peak rating for electrolytics. Leads of the selector are clipped in place of the defective capacitor.

the unit down. The voltage across the capacitor reaches its maximum value before the torque and then starts to decrease. Since the voltage across the capacitor is determined by the design of the starting winding and the line voltage, the voltage across the capacitor is a good indication of the proper sized capacitor.

Standard practice today calls for a maximum capacitor voltage of 138 volts during the starting period for a 120-volt motor. This voltage lasts for a very short period of time, usually less than one second. Higher voltages, such as occur with undersized capacitors, will decrease the life of the capacitor markedly. The use of undersized capacitors will not prevent the motor from starting, but it will increase the starting time and the voltage across the capacitor.

Since electrolytic motor-starting units are not continuous-duty units, the excessive voltages and starting period that occur with improper capacitors decrease the life of the unit. If the capacitor is too small, the torque produced may be insufficient to bring the motor speed up to the point at which the centrifugal switch disconnects the capacitor from the line. Under such conditions the capacitor soon fails by drying out. The start-

ing period should not exceed three seconds in a properly functioning motor.

These capacitors are made for intermittent duty only, and are usually damaged by the failure of the associated equipment. *It is important, therefore, to determine and eliminate the cause of capacitor failure before replacement.* In addition, the replacement capacitor should be of proper capacity and voltage rating. The use of a wrong capacitor will usually result in rapid failure. For that reason, AC electrolytic capacitors are guaranteed as follows:

I. 110-volt Capacitors—

- (a) *Starts* — Heavy-Duty Capacitors (standard foil and gauze), not more than 20 starts per hour, each start not over 3 seconds' duration (except that not over 100 times per year the capacitor may be on the line for periods not exceeding 10 seconds maximum). Ultra-Compact Capacitors (etched foil and reduced gauze) not more than 20 starts per hour, each start not over 1 second duration (except that not over 50 times per year the capacitor may be on line for periods not exceeding 10 seconds maximum).

- (b) *Voltage*—not in excess of 125% of



After you have determined the rating of the capacitor needed for replacement through the use of a selector, you may be faced with the necessity of making a special trip to pick up one from your nearest jobber. The emergency capacitor, illustrated, with its colored leads representing capacities from $17\frac{1}{2}$ to $15\frac{1}{2}$ mfd., may save that trip. Plugging as many leads into the grouping connector as needed ties in desired sections in parallel for the total capacity required.

the rated voltage during any service period.

- (c) *Ambient temperature* — not to exceed 130° Fahrenheit.
- (d) *Damage* — Capacitor shall not have been damaged after shipment by manufacturer.
- (e) *Motor, defects* — Capacitor shall not have been subjected to abnormal operating conditions resulting from motor and associated defects such as
 - (1) defective or dry bearings; (2) sticky compressor; (3) tight belt; (4) defective centrifugal switch or relay; (5) improper adjustment of thermostat or refrigerator valves.
 Before applying capacitor, always check (a) centrifugal switch or relay; (b) easy turning of motor and compressor; (c) thermostat and valves, as a prerequisite of the guarantee.

II. All Other Voltages—

Same as for 110-volt capacitors except that the voltage applied to the units during any service period may not exceed 10% of the rating.

It is recommended that the serviceman should check the following points before leaving the job:

1. Measure the voltage across the capacitor during the starting period. It should not exceed 138 volts for 110-volt capacitors. For other voltage ratings, it should not exceed 110% of the nominal rating. If the voltage across the capacitor is higher than the limiting value given, it usually indicates a capacitor of too low capacity.
2. Time the duration and frequency of the starting period. It should not exceed the limits given in the guarantee. If the start takes too long, either the capacity of the unit is incorrect—too high or too low—or the associated equipment is defective.

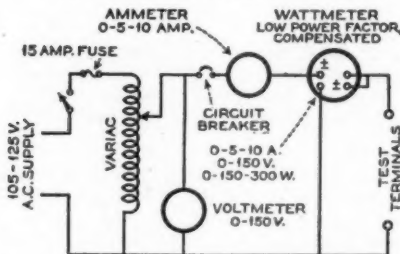


Fig. 3. Circuit diagram for measurement of capacity and power factor by the Ammeter-Voltmeter-Wattmeter method.



The emergency capacitor is left in the motor compartment of the refrigerator. Two clips connected in place of the defective capacitor ties in the emergency capacitor with its grouping connector. Later, at his convenience, the serviceman replaces the emergency unit with an exact replacement capacitor.

Too frequent starts (over 20 per hour) should not be allowed. It usually indicates some defect in the control equipment.

3. Measure the temperature of the capacitor motor compartment. It should not exceed 130° F.
 4. The container of the capacitor should be insulated from ground.
- Attention to these factors will generally result in a satisfactory job.

Electrolytic motor starting capacitors may be tested for their capacity and power factor by connecting them to AC of proper voltage, and reading the current and wattage of the unit. The capacity of the unit is then approximately

$$C \text{ MFD} = \frac{159,300 I}{f E} \text{ amperes} \text{ cycles p. sec. x v.}$$

Table I has been compiled to facilitate computation of capacities at various voltages and frequencies.

The power factor of the capacitor is the measure of the loss of power in it. Capacitors of high power factor do not give as high a starting torque for a given capacity as those with a low power factor. For the same torque higher capacity should be used for units with high power factor. Capacitors with a very low power factor may be readily made at a sacrifice of stability and life. As a result, a compromise between all the factors involved produces the best overall performance.

The value of power factor is given by the expression:

Table 1. Capacity in microfarads electrolytic motor starting capacitors.

	Any voltage E	110 volts	220 volts
Any freq.	$159,300 \frac{I}{f E}$	$144.8 \frac{I}{f}$	$72.4 \frac{I}{f}$
25 cycles	$6368 \frac{I}{E}$	$57.9 I$	$28.9 I$
60 cycles	$2653 \frac{I}{E}$	$24.1 I$	$12.06 I$

$$\text{Power Factor \%} = \frac{W}{EI} \times 100$$

Fig. 6 facilitates the computation of both capacity and power factor from the measured values of voltage current, and wattage. For the usual requirements in service the wattmeter used should be capable of carrying about 10 amperes with a full scale of 150 watts. Such wattmeters are known as low power factor wattmeters and are generally specially made to order.

Since the capacity of the unit is by far more critical than its power factor for satisfactory service, for most purposes the use of a voltmeter and an ammeter is sufficient.

If a circuit breaker is not available, the capacitor should first be tested for a short. This can be done in several ways. The easiest method is to test the unit on D.C. if a source is available. The capacitor is connected in series with a 100-watt lamp across a 120-volt D.C. line. The lamp will light to full brilliancy when a shorted unit is connected across the line. A capacitor having high leakage will cause the lamp to glow. This test for leakage has very little meaning, as any leakage that will cause a 100-watt lamp to glow is much too great to be tolerated. The 100-watt lamp can be replaced with a 20-watt lamp to give a better indication of leakage. A short can be determined on A.C. with the circuit shown in Fig. 4. The neon lamp will light up when a shorted capacitor is tested.

Another method of testing a capacitor for power factor does not require a wattmeter but entails considerably more calculation. The capacitance is found, as before, from the current and voltage readings. To find the power factor, the effective or equivalent series resistance of the capacitor is found by the following method: The capacitor is

connected in the circuit of Fig. 5, and a reading of the current and voltage taken with the knife switch open (E_1 and I_1). If the capacitor is not shorted, the knife switch is closed and another reading of the current and voltage taken (E_2 and I_2). The capacitance is found from the second set of readings. To find the equivalent series resistance use is made of the following equation:

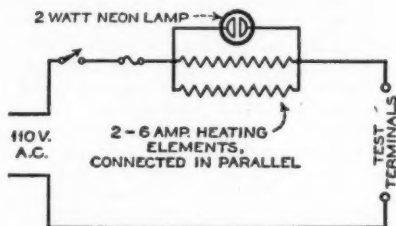


Fig. 4

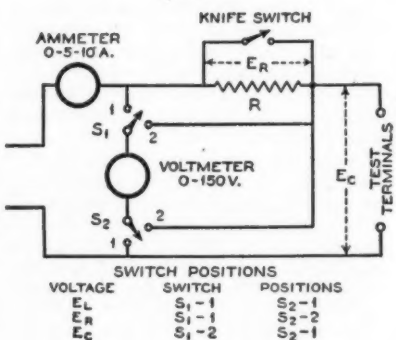


Fig. 5

$$R_s = \frac{\left(\frac{E_1}{I_1}\right)^2 - \left(\frac{E_2}{I_2}\right)^2}{2R}$$

E_1 and I_1 are the readings with the switch open and E_2 and I_2 are the readings with the switch closed. The power factor of the capacitor is then given by the equation

$$\text{PERCENT P.F.} = \frac{R_s}{\left(\frac{E_2}{I_2}\right)} \times 100$$

No simple graph or chart can be made for the calculation of the first equation. If R is fixed, a family of curves can be computed

Table 2. Typical capacitor ratings for capacitor start motors.

Motor Rating H.P.	Motor Speed RPM	Capacitors Ratings MFD
1/8	3450 1725 1140	75-84
1/8	3450 1725 1140	89-96
1/4	3450 1725 1140	108-120 124-138
1/2	3450 1325 1140	161-180
1/2	3450 1725 1140	216-240
3/4 & 1	3450 1725 1140	378-420

and used for a more rapid calculation of the resistance but this does not save much time.

For the average sized motor starting capacitor a resistance of 20 ohms is a satisfactory value. The exact value of the resistance is not necessary as the voltage drop across it can be found. The circuit can be so arranged as shown in Fig. 5, so that by pressing a series of 3 buttons the voltmeter can be connected across the resistor, the capacitor and the line in any order desired. The current will be read on the ammeter as before.

The equivalent series resistance is

$$R_e = \frac{\frac{E_1^2 - E_R^2}{I_1^2} - \left(\frac{E_2}{I_2}\right)^2}{2 \frac{E_R}{I_1}}$$

E_1 and I_1 taken with switch open
 E_2 and I_2 taken with switch closed
 E_R is voltage across R

With this sequence of measurements it is not necessary to make a separate short circuit test as the first reading, with the knife switch open, will be sufficient to indicate a shorted capacitor. When a 20-ohm series resistor is used, the current will be equal to the voltage divided by the 20 ohms if the capacitor is short circuited. Thus, if a 150-mfd. capacitor is being tested on a 120-volt line, the ammeter will read 4.5 amperes for

a good unit and 6 amperes for a shorted unit. If the unit is found to be good the readings of current and voltage are recorded and the knife switch closed. The readings of current and voltage are again recorded and the computations performed. A sample computation is given below.

$E_1 = 120$ volts $I_1 = 4.0$ amperes

$E_R = 80$ volts $E_2 = 120$ volts

$E_G = 85.6$ volts $I_2 = 5.6$ amperes

To find the power factor the first and second sets of readings are used.

$$R_e = \frac{\frac{(120)^2 - (80)^2}{4^2} - \left(\frac{120}{5.6}\right)^2}{\frac{2 \left(\frac{80}{4}\right)}{14400 - 6400} - \frac{14400}{16} - \frac{14400}{31.6}}$$

$$= \frac{40}{500 - 460} = \frac{40}{40} = 1.0 \text{ Ohm}$$

The power factor of this capacitor is then found from equation

$$\text{PERCENT P.F.} = \frac{R_e \times 100}{\frac{E_2}{I_2}} = \frac{1}{\frac{120}{5.6}} \times 100$$

$$= \frac{1}{21.4} \times 100 = 4.7 \text{ PERCENT}$$

Two methods are in use to designate the capacity of capacitors; either their nominal value is given or the limits of capacity are listed. For the first case, the usual tolerance employed by most motor manufacturers is minus 10 plus 20%. The second method fixes the lower limit by the value given. The upper limit, however, is generally 15% greater than the figure listed for the range. Frequently superior performance is obtained in such cases with capacitors of somewhat higher capacity.

Table 2 lists the capacitors usually used for various sizes and types of capacitor start motors.

Some capacitor-start motors may require capacitors other than those listed and if there is any question as to the correct rating of the capacitor, the exact value can be determined by the use of the capacitor selector.

Because of the wide diversity in capacitance and voltage ratings for motor starting and running oil capacitors, it is not practical to list the typical capacitors for different motor ratings.

Power Factor Control

In many cases it is possible to increase the power factor of a line by connecting power factor correction capacitors across the motors on that line. For this purpose oil-impregnated paper capacitors must be used. Table 3 gives the approximate total capacity required for various size motors operating at 220-240 volts 60 cycles 3-phase. These values can be used for single phase 220 volt 60 cycle motors. When used for 3-phase motors one-third of the capacity required is connected across each pair of lines. For single phase operation, the total capacity given is connected across the line.

In addition to the increase in line capacity, the uses of the power factor capacitors will improve the voltage regulation of the line especially on long feeders.

The use of capacitors across lines supplying neon signs or fluorescent tube lighting equipment will decrease the voltage fluctuations and flicker, due to sudden changes in load. In addition, use of capacitors will decrease to a certain extent the radio interference produced by these devices.

Capacity—Current—Power Factor Chart

Instructions for the use of capacity—current—power factor chart for electrolytic motor starting capacitors.

1. To find the capacity of a capacitor from the current readings when the capacitor is connected across a 110-volt circuit draw a line vertically from the current scale to the line marked mfd-scale A and read the capacity on the right-hand scale marked A. If the current drawn by the capacitor is greater than 4 amperes use scale marked mfd-scale B and read the corresponding capacity on the right-hand scale marked B, in the lower right-hand corner of the chart. The capacity can also be found by reading the capacity on the scale marked C-C in the center of the chart.

Example: To find the capacity of a capacitor which draws 2 amperes from a 110-volt line.

From the point marked 2 amperes on the current scale, draw a perpendicular line to the scale marked mfd-scale A. From the point of intersection, "X", draw a horizontal line to the right and read the capacity, 48 microfarads on scale A. The capacity may also be read at the point "Y" where the vertical line crosses the scale marked C-C.

Table 3. Approximate total capacity in mfd. required for power factor correction of standard 220-volt 3-phase induction motors. Approximately one-third of the values given should be used across each phase.

HP	Speed in RPM					
	3600	1800	1200	900	720	600
1/2			20	39		
3/4		15	24	36		
1	15	21	24	30		
1 1/2	15	21	36	54		
2	24	21	36	60		
3	24	24	51	75		
5	30	36	75	99	99	165
7 1/2	39	51	75	165	201	222
10	39	60	84	165	175	250

2. To find the power factor from the current and wattmeter readings, draw a horizontal line from the power scale on the left of the chart, and a vertical line from the current scale on the bottom of the chart. Read the power factor at the point of intersection of the two lines. The capacity may be determined by extending the vertical line until it intersects the scale marked C-C or the scale marked mfd-scale A or B.

Example: To find the power factor of a capacitor which draws 2 amperes and 16.5 watts from a 110-volt line.

Draw a horizontal line from the point marked 16.5 watts on the power scale at the left of the chart, and a vertical line from the point marked 2 amperes on the current scale, and read the power factor at the point of intersection "Z." The power factor will be 8%.

3. To find the current that will flow when a given capacitor is connected across a 110-volt line, draw a horizontal line from the microfarad scale A or B, on the left of

CHARACTERISTICS OF 110 VOLT ELECTROLYTIC MOTOR STARTING CAPACITORS AT 60 CYCLES

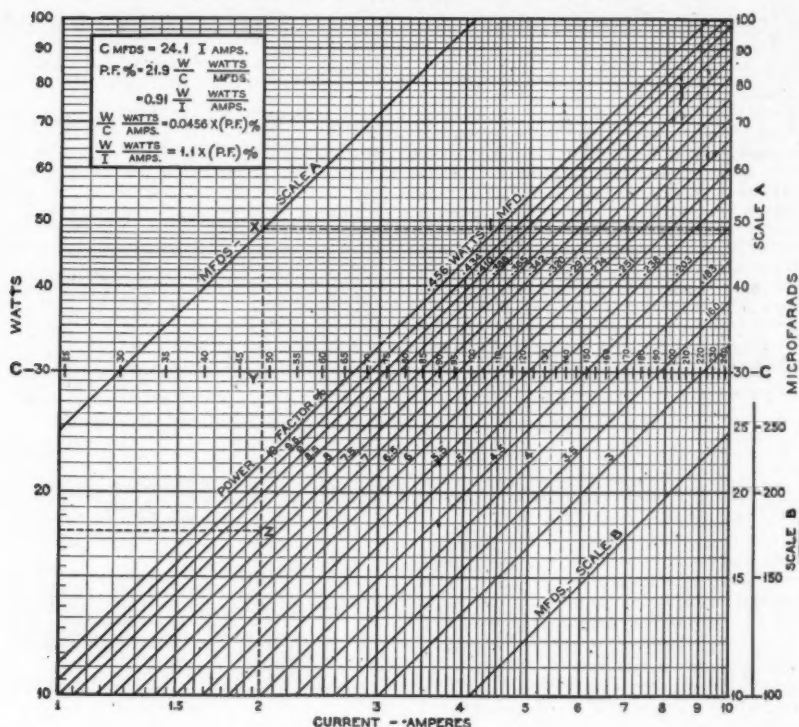


Fig. 6.

the chart to the corresponding mfd line, and drop a perpendicular to the current scale at the bottom of the chart. The current can also be found by dropping a perpendicular line from the desired capacity value in microfarads on scale C-C to the current scale.

Example: To find the current taken by a 48-microfarad capacitor when connected to a 110-volt line. Draw a horizontal line from 48 microfarads scale A to the mfd-scale A, and drop a perpendicular line from the point of intersection "X" to the current scale on the bottom of the chart, and read 2 amperes.

4. To find the power in watts for a capacitor of known capacity and power factor. Draw a vertical line from the value of capacity in microfarads on scale C-C to the power factor line given and then

draw a horizontal line from the point of intersection to the power scale on the left of the chart.

Example: To find the power of a 48-microfarad capacitor, 8% power factor when connected to a 110-volt line. From the point "Y," 48 microfarads, on scale C-C drop a perpendicular line until it intersects the 8% power factor line at the point "Z." From that point draw a horizontal line to the power scale on the left of the chart and read 16.5 watts.

John M. Quigley
Pittsburgh, Pa.

Enclosed is my check for a renewal of my subscription to your magazine. It has been of considerable help and education to me. I hope I will always be a subscriber.

SERVICE POINTERS

Practical Solutions of Your Service Problems

THIS department is an aid to service engineers who are seeking new devices or methods to improve their work. All the service pointers have been supplied by the subscribers. THE REFRIGERATION SERVICE ENGINEER invites readers to submit "down-to-earth" practical service and installation information. Five dollars will be paid for each pointer published. Every service engineer has one or more "kinks" that have proved useful in every day practice. Here is your opportunity to exchange service pointers with the other fellow and earn \$5.00 for the information. Write up your idea today and mail it to the Service Pointer Editor.

BAD ODOR

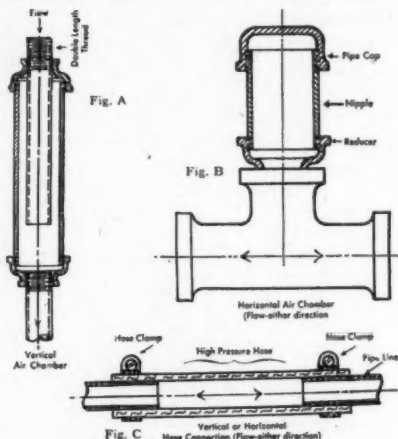
A FEW months ago I installed a water cooler in an office. It was a Copeland unit. The refrigerant was methyl chloride. It had been in use about two months when I got a call to check it for a very bad odor. The odor smelled like a decaying rat, so I checked the motor but found nothing. I also checked the insulation and that was rat-proof so I figured it was a dead rat behind the wall and would be gone in a few days. A month later I got another call to the same cooler. They said they had several to check it but none could find where the odor was coming from.

When all the office workers were gone for the night I took the unit out piece by piece and smelled it. When I got to the compressor I found that the odor was coming from it. I pinched off a small piece of the gasket and there was the terrible odor. I took off all the gaskets and washed all the compressor parts with carbon-tet, then put on new gaskets. It must have been the material from which the gaskets were made, and when the refrigerant and oil soaked into them it caused the odor. So when you get a call about a bad odor don't give up until you check your gaskets. I stopped in a few days later and was told that the odor had completely gone.—Submitted by Harry Dixon, Farmville, N. C.



ELIMINATING WATER HAMMER

ANY quick-acting water valve can cause a water hammer. If this occurs, it can be eliminated or reduced by an air surge chamber on inlet side of valve, Figures A



Three methods of providing a cushion in water lines

and B. Either the vertical or horizontal chamber can be constructed of standard pipe and fittings. Another effective method is to insert a piece of hose (about 8" long) in the water line. Note Figure C.—Courtesy of Automatic Products Co.

SOLDERING KELVINATOR EVAPORATOR

TO HAVE the evaporator re-porcelainized on a Kelvinator Cabinet No. 25957—K6-37R, 37EV3 unit No. 48205, one must remove the fast freeze plate on the evaporator.

In reassembling, unit trouble is sometimes encountered from solder flowing into refrigerant distributor tube attached on adaptor block which is screwed into evaporator at the bottom back. To insure all permanently tight connection you braze all the connections. First, cut two 1/4" tubes to "fast freeze" plate, remove all solder from every joint, braze distributor tube (3/16" tube) into

adaptor. Next braze two tubes to "fast freeze" into adaptor, replace adaptor into evaporator with litharge and glycerine; then extend the two $\frac{1}{4}$ " tubes from "fast freeze" plate, swedge and braze, hang evaporator, attach pressure fitting from high side float tube and job is done.—Submitted by Herbert Kraft, New Braunfels, Texas.

REPLACING TRANSFORMERS WITH CAPACITORS IN G. E. MOTORS

WHEN the transformer in G.E. $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ hp. motors become defective they can be replaced with capacitors and at the same time simplified in hookup. Indication of trouble in its early stages is heating of the box on top of the motor.

The box can be removed and heated until the wax is removed. Replace the transformer with a 100 mfd. electrolytic condenser and seal up with paper or wax. Connections to the motor are made as shown in the wiring diagram Fig. 1.

Induction motors can be improved both in current consumed and improved power factor by fully loading the motor or installing glass plate capacitors across the motor

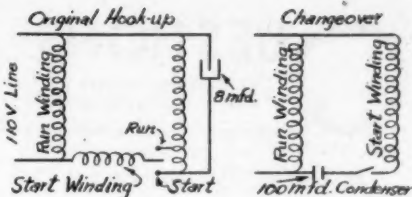
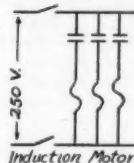


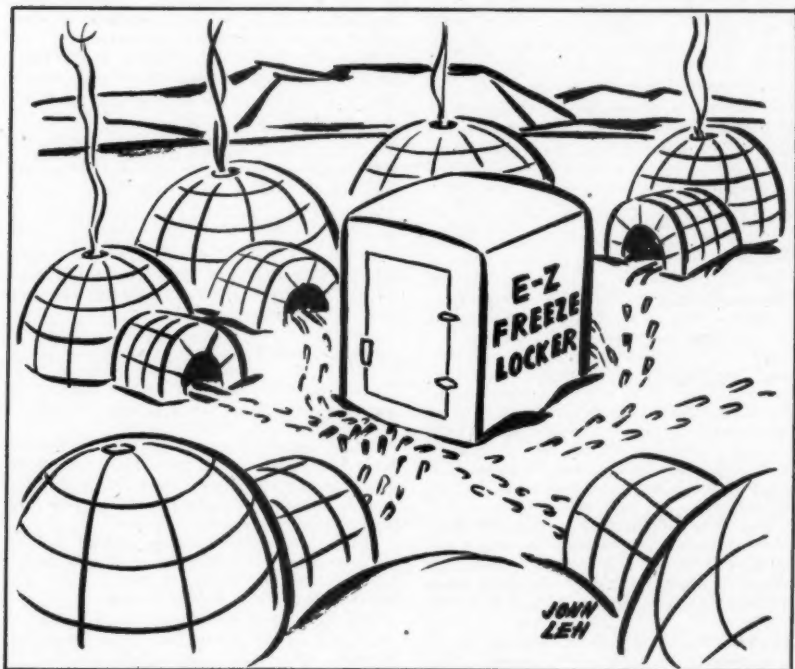
Fig. 1. Above

Fig. 2. Left



connections. For example, assume a single phase motor draws 6 amperes at 250 volts AC. Connect about four 8

mfd. glass plate condensers or telephone condensers, that will not break down on 250 V, across the connections as shown in Fig. 2. Connect a fuse in series with them for protection. This increases the power factor, reduces current consumed. It makes the circuit more capacitive and less inductive.—Submitted by J. M. Gantt, Montgomery, Ala.



QUESTIONS AND ANSWERS

On Problems of Servicing, Installation and Maintenance of Household and Commercial Refrigerating Equipment—Send Your Problems to the Question Box.

TEMPRITE COOLER FREEZES

QUESTION 744: I was called on a Bastian-Blessing soda fountain that had trouble with the Temprite cooler for water. The old Temprite had been by-passed and a new one ordered but the serviceman who had disconnected it would not install the new one. After installing the Temprite cooler, I can't keep the water from freezing.

This fountain, using "Freon," has a thermo expansion valve for the ice cream section and one for the syrup rail and Temprite cooler. I am not familiar with the Temprite products. The tag on this one reads cut-in 39° and cut-out 33° which was set at the factory, but after adjusting to the warmest position the water still freezes. Could it be that this model is for CH_2CL ? Any information will be appreciated.

ANSWER: I believe your analysis of the Temprite trouble is correct. The Temprite control valve is a pressure operated valve, therefore if it is designed for methyl chloride, its operating range will be from 23 lbs. to 26 lbs. At "Freon-12" pressures this will result in temperatures from 20° to 28°.

The valve can be tested by removing it and checking by installing an accurate pressure gauge between the valve and a cylinder of "Freon" or methyl chloride. The valve should open at 26 lbs. and close tightly at 23 lbs. If the valve is designed for "Freon-12" the operating range will be between 33 lbs. and 37 lbs.

There is a possibility that the valve is not closing tightly due to some foreign particles under the seat. This can be checked when it is removed for testing.

ALUMINUM FITTINGS

QUESTION 745: I would like to know what effect "F-12" has on aluminum. There are quite a number of aircraft aluminum flare fittings aboard ship and I wondered if it would be advisable to use them on my "F-12" units.

In answer to Question 733 of the February issue you mentioned aluminum causing a rise in head pressure. Was this caused by a chemical reaction of the refrigerant upon the metal? Of what other refrigerants is this also true?

ANSWER: Common acceptance of aluminum products for use with "Freon-12" as the

refrigerant indicates that there is no reaction.

The refrigerant which does react with aluminum and magnesium is methyl chloride. It is, therefore, highly important to avoid using methyl chloride when either of these elements are present in the system. The reaction is violent because complete disintegration takes place and when oxygen is present an explosion results.

I do not believe you will have any difficulty by using the aircraft fittings but am not too familiar with their strength nor ability to hold "Freon" gas.

NORGE ROLLATOR PRESSURE

QUESTION 746: Does the Norge rollator on the old model domestic units have a discharge check valve? Is it a normal condition to that type of compressor for an unloading feature that the compound gauge should rapidly rise to nearly equal the high pressure gauge when the compressor stops?

ANSWER: The Norge rollator compressor does equalize pressures after unit stops. The check valve in the suction side prevents high pressure gas from backing up in the suction line, but the pressures within the compressor will approximately equalize to that of the high pressure side.

SELECTING CAPACITORS

QUESTION 747: I would appreciate your help on the following information about capacitor motors and any additional information you have available.

How can we be sure to replace a defective capacitor with the correct size, when the capacity of the original is not available? Is there a capacitor selector on the market, or have you any plans for building a capacitor selector device?

What takes place when a capacitor is placed in series with a starting winding? What purpose does a capacitor serve when connected with a running winding and how to determine its correct capacity?

What is considered a good testing method to determine if a capacitor in use is doubtful? At present I use a series lamp test which I feel is not a reliable test.

ANSWER: One method of determining capacitor sizes on motors is a trial and error method. This, of course, does not sound so

simple when applied to capacitors but it is done simply by having two or three of the more common size capacitors on hand and then trying each one in turn until proper operating conditions are obtained. Proper operating conditions are determined by the time required for the motor to pick up speed and throw off the starting contact, connecting the running winding.

One manufacturer who makes a capacitor selector is the Aerovox Corp., New Bedford, Mass.

An explanatory article on the use of capacitors, methods of testing for defects and typical wiring diagrams of motors employing capacitors, can be found in the September, 1938 issue of THE REFRIGERATION SERVICE ENGINEER on page 9.

CANNOT FIND LEAK

QUESTION 748: Regarding a Hill Lipman meat case with double coil and Detroit 673 thermostatic expansion valve, Frigidaire unit, $\frac{1}{2}$ hp. charged with CH_2CL . This case invariably loses the gas over a period of three to four months. I have serviced this case three times in the past year and each time I find it short of methyl chloride. I raised the lowside to 50 lbs. but the torch shows no leak. I also charged four ounces of Trace last September but cannot find a sign of the leak. Otherwise the case is OK by recharging with methyl chloride every three or four months.

I tested the coils, valve, control, condensing unit and followed the lines with the torch. Can you suggest any other means of testing? I thought of SO_2 and Acrolen but hesitate as to what it might do to the meats.

ANSWER: You apparently have a very slow seepage of refrigerant in the Hill Lipman meat case which you find necessary to recharge every three to four months. These leaks are difficult to find and if it is so small that Trace will not show up the leak, it would seem probable that the main component parts would have to be removed and submerged in a tank of water in order to determine the location of the leak.

It is possible, occasionally, that a seal will leak while the compressor is running and will not leak when it is idle. I assume that your tests have been made with the machine idle for safety sake, and in any case the currents of air set up while the machine is running makes it difficult to test with a leak detector at that time.

Very slight seepage through gaskets due to the type of gasket used is another possibility but, of course, in all these suggestions I can only guess and perhaps the shortest

route to solve your trouble would be a submersion of the unit under pressure in water.

CAPACITY OF MODEL K FRIGIDAIRE

QUESTION 749: I have a Frigidaire Model "K" $\frac{1}{2}$ hp. condenser unit, 2 cylinder compressor, SO_2 gas. How many Btu. per minute at 20°F ? What is the proper evaporator size to match this unit?

ANSWER: The Model "K" Frigidaire was rated at 140 lbs. of ice melting capacity based on a 14 hour running schedule. The conditions under which this capacity would be obtained is an 80°F . condensing medium, a $7''$ back pressure and a 20°F . coil.

The size of evaporator would depend entirely on the application, the humidity required and the temperature to be maintained, therefore I cannot tell you the size of evaporator to use. The size of evaporator is not determined from the size condensing unit used but rather from what is to be refrigerated and the conditions to be maintained.

AIR CONDITIONING INSTALLATION

QUESTION 750: I have just received a $1\frac{1}{2}$ hp. air cooled condenser and am ready to install a remote system of room comfort cooling. The new receiver is 8 lb. capacity "Freon." The old charge was 8 lb. while it was in water cooled package unit. It will now be remote and the distance from compressor to cooler will be 25 ft. from basement to first floor ceiling, also the condenser will have greater capacity than the original water cooler. Do you think more than 8 lbs. "Freon" should be added?

There will be a $12''$ trap in the lines between compressor and evaporator in order to clear a cellar door frame. Will this affect the gas return?

The oil capacity of compressor is one quart. Will more oil be needed for the job?

The motor fan will be a single blade $10''$ suction type to cool condenser. A Sporlan thermostatic expansion valve with a capacity of one ton, suction pressure of 55 max. lbs., with equalizer connection will be installed. The compressor fly wheel at present is 450 r.p.m.

In rear of evaporator will be two $7''$ Balentine fans, in tandem.

The condensate line will be $\frac{1}{2}''$ copper O.D. enclosed inside a $1\frac{1}{4}''$ rubber hose with the gas and liquid lines until it reaches the basement wall. From there the line will continue to the outside. The liquid line will be $\frac{3}{8}''$ O.D. Is this the correct size for distance and pressure drop?

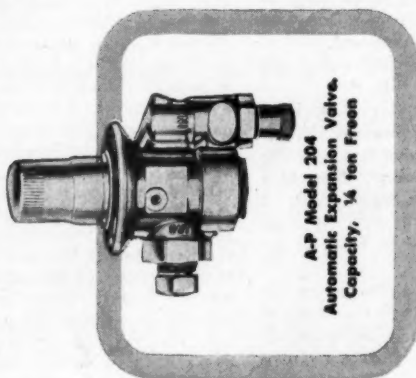
A Solenoid valve will be used on liquid line and will be wired to evaporator fan



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switch for manual control. Should I use a relief valve on the high side to open to atmosphere?

It seems when I purchased machine, used four months, I found one of the returns on the evaporator blown open from excessive pressure and no relief valve in unit. I would appreciate your help on this installation.

Auxiliary Receiver May Be Needed

ANSWERS It is quite probable that the 1½-hp. condensing unit installed in the room cooler had an excessive supply of refrigerant when it was charged with 8 lbs. and the addition of 25 feet of liquid line would not reduce the supply sufficiently so that more refrigerant would have to be added in the new installation. In other words, it is quite probable that 8 lbs. of refrigerant will still be sufficient.

If it should happen that 8 lbs. is not enough, it would seem that an auxiliary receiver would have to be added to the machine which would provide a safety capacity in the event of stoppage in the liquid line causing all of the liquid to be pumped down into the condensing unit or receiver. An 8 lb. receiver does not seem to be large enough where more than 8 lb. charge is required by the system.

Eliminate Trap

If it is at all possible I would suggest that you try to eliminate the 12" trap in the suction and liquid line. Traps can too often become a source of trouble due to the trapping of oil which will reduce the effective suction line area and in turn cut down the capacity of the system. The trap may not give any trouble, particularly if the suction line is of the proper size and sufficient velocity of the returned gas is maintained which, in turn, will sweep the oil back to the compressor with it.

The quantity of oil will very likely have to be increased because a certain amount will be carried from the compressor to the evaporator with the "Freon." The best method of determining the amount of oil is to allow the machine to operate a day, then add oil to the compressor to bring it up to its original level.

A relief valve with a discharge to the atmosphere is a good safety device but can also be a troublesome source of leaks. If your local ordinance or city code requires that a relief valve be used, then certainly you must use one.

IF I WERE STARTING BUSINESS

QUESTION 751: I would greatly appreciate any available literature and information which you consider helpful to a new organization just starting in the refrigeration service business.

Perhaps if you knew a little more about our organization you would be in a better position to help us. At the present time my partner is in Silver Springs, Maryland, but I am still in San Diego, Calif. waiting for my discharge from the United States Navy. You see what a problem this presents. However, I should be discharged by the 2nd of May and we hope to be in operation by the 1st of June. We plan to service and repair domestic and commercial refrigeration systems as well as air conditioning installations. We are undecided, however, whether to make our service the primary function and sales the secondary, or vice versa. What is your opinion? We would also like to become a local outlet for a well-known and reliable line of equipment. Just what would be the requirements for this?

ANSWER: We are planning the publication of a book in the near future devoted entirely to this subject but it may be a matter of three or four months before it is available to the reader.

If I were starting my own business in the refrigeration field, I would make service my primary function and add sales as I was able to do so, for these reasons:

1. Sales are largely dependent on general business conditions. In good times everyone makes money but in depression periods, sales are highly competitive and thinly spread.

2. The company making sales its primary function, seldom makes a success of its service department, probably because of a lack of experience in the work.

3. There is always plenty of work for the Service Co. In depression years, the customer makes the old equipment do, keeps it in repair. In good times the service company installs and services the new equipment, expands and improves the old.

4. As the market reaches the point of saturation so a higher percentage of sales are made through the replacement field. Therefore, it is thought, 90% of future sales will be made through the replacement field. The service company has, and always will have, the advantage in these sales because he is already known to the customer and presumably has gained his good will.

5. The service business will grow and improve both in volume and working conditions for some years to come, irrespective of general business conditions.

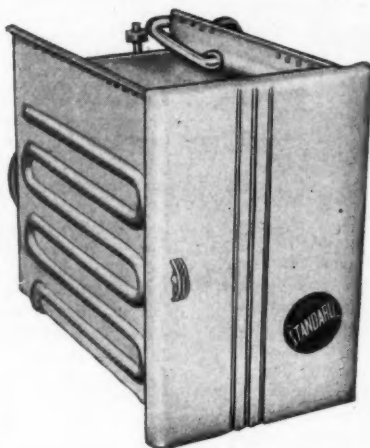
STANDARD *Paints* *With Pride*

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Equal Efficiency
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SERVICE ENGINEER

51

June, 1946

Government Bureaus—News and Rulings

SERVICE FIRMS CAN INCREASE REPAIR CHARGES TO MEET WAGE BOOSTS

OPA has provided relief for refrigeration concerns employing eight or less persons to increase service charges to meet rising labor costs since Oct. 3, 1942.

Firms servicing refrigerators, refrigerating equipment up to 25 hp., air conditioners up to 25 tons capacity, are covered.

The change is made by issuance of Amendment 4 to Supplemental Service Regulation 22 of Maximum Price Order 165, effective May 25, 1946.

The amendment restores Supplemental Service Regulation 22 to its original form. It had been altered on Feb. 9, 1946, when paragraph (a) (4) (authorizing automatic price increases based on authorized wage increases) was deleted.

A new paragraph (a) (4) is added to read as follows:

(4) He (the service firm proprietor) may if he employs a total of not more than eight persons and if wage increases paid by him were not in violation of any regulations affecting wage increases, add to a customer's hourly rate, determined under subparagraphs (1), (2), or (3) an amount equal to the increase since Oct. 3, 1942, in the average basic straight-time hourly rate for mechanics performing each type of service. Adjustments under this subparagraph (4) may not be made more often than once every 30 days.

Paragraph (d) (4) is redesignated (d) (5), and a new paragraph (d) (4) is added to read as follows:

(4) In the case of sellers adjusting their prices under paragraph (a) (4), a statement of the hourly wage rate of each employee shall be prepared on the date of any price increase, made under this regulation.

The three methods of determining the customer's hourly rate referred to in the amendment are:

(1) Charge the highest customer's hourly rate that the seller charged in March, 1942.

(2) Charge the customer for each hour of service a price that is double the average basic hourly wage rate paid on Oct. 3, 1942, to employees performing the particular type of service. (Oct. 3, 1942, is the date when wage rates were stabilized under the Economic Stabilization Act.)

(3) Charge the customer 60 cents more

per hour of service than the average basic hourly wage rate paid on Oct. 3, 1942, to employees performing the particular type of service.

CEILING PRICE INCREASE ON REPAIR AND REPLACEMENT PARTS

MANUFACTURERS of repair and replacement parts for household mechanical refrigerators, domestic washing and ironing machines, vacuum cleaners and attachments, are permitted to increase ceiling prices 5% to 16.5% on these repair parts. The increase permitted on repair and replacement parts for refrigerators is 16.5%.

Resellers of these articles may determine their ceiling price by adding to the invoice cost their established markup for the same or similar article. In the absence of an established markup, the reseller applies to OPA for the establishment of his ceiling price. The provisions of the regulation applying to resellers' prices are:

(a) A purchaser for resale who delivered or offered for delivery during March, 1942, an article which meets the definitions of "most comparable article" contained in Section 1499.3 (a) of the General Maximum Price Regulation, except that it need not be currently offered for sale, shall determine his ceiling prices for resales of such parts by adding to his invoice cost the same markup he had on that comparable article, according to the method and procedure set forth in that section.

(b) If a purchaser for resale cannot determine his ceiling price under the above method, he shall apply to the Office of Price Administration for the establishment of his ceiling price under Section 1499.3 (c) of the General Maximum Price Regulation. Ceiling prices established under that section will reflect the supplier's prices adjusted in accordance with this paragraph.

OPA Supplementary Regulation 15, Amendment 51, Effective April 30, 1946.

PRICE INCREASE ON CONTROLS

MANUFACTURERS and resellers of automatic electric temperature controls for heating, air conditioning and refrigeration are authorized to raise their prices 20.8 per cent over their October 1, 1941, prices.

\$105,000.00 AIN'T HAY!

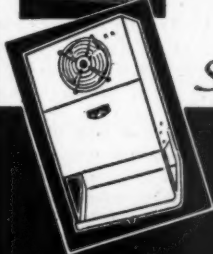
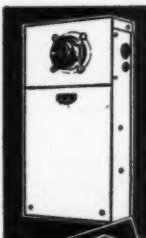
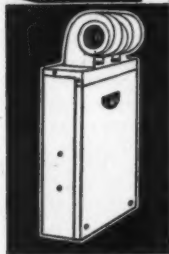
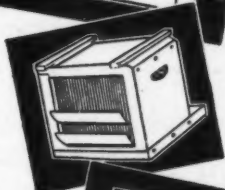
**We spent in excess of
\$70,000.00 last year
for additional equip-
ment and facilities
trying to keep up with
the demand for Filter-
pure Cooling Units**

AND

**We have contracted
for \$35,000.00 more
tools and machinery
for delivery August 1
to further increase
production.**

Sold by Leading Refrigeration Wholesalers

**BETZ CORPORATION
HAMMOND, INDIANA**



The new ceilings, covering advances in costs and selling expenses are expected to make possible profits to the industry comparable to those realized in the 1936-1939 base period. They went into effect May 24, 1946.

Approximately 85 per cent of all sales of the controls are made to manufacturers of other equipment who incorporate the controls in, or furnish them with their products and who include their cost in their selling prices. Sales over the counter to consumers are less than one per cent of the dollar volume. Therefore no absorption by resellers is being required. The action today does not cover industrial process controls.

(Amendment 14 to Order 1 under Section 22 of Maximum Price Regulation 591—Specified Mechanical Building Equipment—effective May 24, 1946.)

§ § §

HOUSEHOLD REFRIGERATOR CEILINGS RAISED

THE retail price of household mechanical refrigerators will be increased on the average slightly over four cents on the dollar as a result of an eight per cent ceiling price increase allowed to manufacturers by the Office of Price Administration.

The manufacturers' increase is effective April 18, 1946, and the retail price increase will go into effect as soon as dealers receive refrigerators invoiced to them at the adjusted prices.

Prior to this increase retail prices of refrigerators were at their average March 1942 level, although as a result of an adjustment of retail prices allowed last fall by OPA many models have been three per cent below March 1942 prices. The present increase will raise these models to slightly above the March 1942 level, while other models for which prices were raised by the action last fall will be increased further.

The eight per cent increase granted the refrigerator manufacturers is the first industry-wide increase granted the industry since the end of the war. The adjustment reflects all labor and material cost increases allowable under the new wage-price policy.

Distributors and dealers are allowed to pass on the exact amount of the manufacturers' increase, so that the consumers will pay the current dollar-and-cent ceiling price plus the dollar amount of the manufacturers' price increase.

As a result of the reconversion adjust-

ments granted last October, over-all dollar margins realized by distributors were reduced below March 1942 levels, and this reduction is the most that can be required under present distributor absorption standards.

(Amendment No. 9 to Maximum Price Regulation 598—effective April 18, 1946.)

§ § §

CEILING PRICE MODIFIED ON SMALL COMPRESSORS

AN INCREASE of 17 percent has been allowed by OPA in the maximum price of a manufacturer for his sale of compressors and condensing units 5 hp. or less in capacity and repair and service parts therefor. This percentage increase is allowed over the base date maximum price of the manufacturer as properly established under MPR 188 or MPR 591 prior to May 9, 1946. The base date price does not include an adjusted maximum price increase by OPA in response to an application for individual price relief.

Re-sellers of the compressors and condensing units and repair or service parts covered by this amendment are permitted to increase their maximum price by the actual dollar and cent increase resulting from the increase put into effect by their suppliers under this regulation. When equipment described above is sold for resale the seller is required to give notice in writing of the dollars and cents increase applying to it, the size unit and part, and the method by which the customer is authorized to determine his maximum price. Manufacturers are also required to notify OPA within 5 days after they increase their maximum price under this amendment (MPR 591 amdt. 11 to Order 1, May 9, 1946).

§ § §

ADJUSTABLE PRICING ALLOWED FOR MAKERS OF SOME ELECTRIC UNITS

MANUFACTURERS of fractional horsepower electric motors and of integral electric horsepower motors and generators may sell them on an adjustable pricing basis, beginning April 16, 1946.

All motors, generators and motor generators, rotary converters, dynamotors, AC and DC, are covered by these actions. One action covers motors smaller than one horsepower (1700-1750 rpm.) and the other covers those of one horsepower (1700-1750 rpm.) or larger.

These motors and generators may be sold

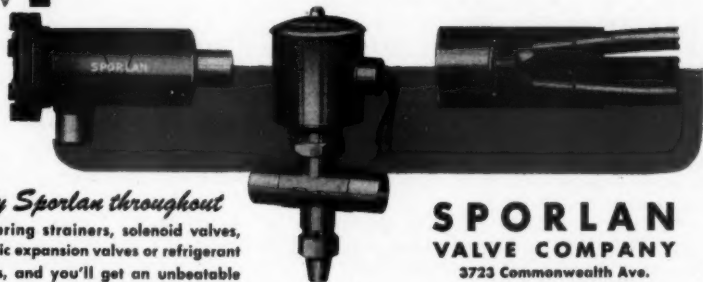
for **PEAK PERFORMANCE** on all
Comfort Cooling Installations

specify



SPORLAN
"G" charge

Only Sporlan offers you thermostatic expansion valves with selective charges... each to do a specific job. So don't just ask your wholesaler for a valve... ask him for a Sporlan valve, selectively charged to give you peak performance on any size installation.



Specify Sporlan throughout
when ordering strainers, solenoid valves,
thermostatic expansion valves or refrigerant
distributors, and you'll get an unbeatable
combination of perfect performers!

**SPORLAN
VALVE COMPANY**

3723 Commonwealth Ave.
ST. LOUIS 17, MISSOURI

at present ceiling prices through an agreement with the purchaser that he will pay the difference between current ceiling prices and any higher prices that may be fixed later by OPA. This action was necessary to assure full production for civilian needs pending completion of industry surveys now being made by the agency to determine if prices should be increased.

(Orders 599 and 600 under Revised Maximum Price Regulation 136—both effective April 16, 1946.)

§ § §

ALLEN FILTER GETS PRICE INCREASE

DUE to increased price of materials and labor, the OPA, according to their act of April 8, have granted The Allen Filter Co., Toledo, Ohio, a 10% increase on the net price of their water coolers. Dealers in turn, can pass this increase on to their customers.

§ § §

OWNERS NEED MORE INFORMATION OF REPAIRS, SURVEY FINDS

HERE'S an authoritative tip to appliance retailers who sometimes wonder why their efforts at creating satisfied customers often go astray; American women don't know how to take care of home appliances and so, of course, aren't getting as much satisfaction from them as they might!

Perhaps startling, but true—the charge that, whatever the reason, the appliance industry's and retailers' educational campaigns have flopped, as far as helping women get the most out of merchandise, goes.

Here's the data, compiled by the College of Home Economics, Syracuse University:

"Although just a scientific sampling, the studies differed in purpose, concerned different income-level groups and varied in emphasis. Yet results were largely the same—American women own expensive equipment, but they don't know how to take care of it!

Facts Revealed in Survey

"One of the more intelligent groups of homemakers, all members of the home bureau, was chosen and 100 questioned, revealing these facts:

"1. They owned 655 pieces of electrical equipment (well above the national average for wired homes), representing an investment of \$41,201.50;

"2. Ninety-two owned washing machines, 88 owned electric refrigerators; about half had sandwich grills and coffee makers; and

such equipment was used regularly, deserving the title of 'electric servant.'

"But, if any of the equipment broke down, most of the women indicated they did not know where to look for trouble, and had insufficient knowledge to attempt repairs themselves and were not sure where to find the best repair service. About 27 per cent of the women left equipment that refused to operate for the man of the house to look over before tinkering with it themselves. Only 25 per cent even knew how to replace blown fuses or repair electric cords.

"The second study, made among parents of students, revealed the average ownership of electrical equipment represented nine pieces, including gas or electric range, gas or electric refrigerators and smaller electrical appliances. Aimed at gauging future needs, this study revealed an interest in quick-freeze units and more frozen-food storage space than their present equipment provided."

And, in concluding, the college provided this tipoff to retailers who want to have customers well-satisfied:

Conclusions

"The over-all picture resulting from these studies indicates a decided need for better education among women in selection, care, use and repair of electrical equipment, which forms such a sizable investment within their homes."

From the retailers' standpoint, of course, the fact that women did not know even where to begin to find the trouble was the basic evidence of failure in two matters: 1. Evidence that retailers who have appliance-servicing haven't advertised it and got results; either their promotion has been faulty or inadequate. And, 2. Evidence that, perhaps, all appliance promotion and advertising has been inefficient if women don't at least think of their retailer when their appliances are in need of repairs.

§ § §

REFRIGERATION BEING USED ON ASSEMBLY OF NEW CARS

ASSEMBLY line use of mechanical refrigeration is one of the new postwar techniques which is helping to speed production of new passenger automobiles.

Installed directly in the motor production line of one of the nation's largest automobile manufacturers, new mechanical refrigeration equipment is being used to shrink steel valve inserts by chilling for



NU-COIL

REFRIGERATOR

**C
O
I
L
CLEANER**

NO OBJECTIONABLE ODOR
UTMOST IN LABOR SAVING
CAN BE USED OVER REPEATEDLY
OFTEN IMITATED
IS PRACTICAL—QUICK ACTING
LET YOUR WHOLESALER
EXPLAIN NOW

SKASOL CORPORATION
112 Glencoe Ave. Webster Groves, 19 Mo.

permanent fitting into cylinder blocks, according to reports to the Refrigeration Equipment Manufacturers Association.

By chilling at a temperature of 120 degrees below zero, the inserts are shrunk two one-thousandths of an inch and automatically ejected for fitting into the cylinder blocks. In room temperatures, the inserts expand to normal size and become a permanent part of the block. Through this recently perfected industrial application of mechanical refrigeration, it is possible to install the valve inserts at the rate of 360 per hour without interruption of the assembly line.

Shrinking of close fitting parts, however, is only one of the functions performed by mechanical refrigeration in the construction of modern automobiles.

Much of the steel and other metal which goes into the body of the new cars is stronger and more ductile because it has been subjected to "cold" treatment. High speed drills, hack saws and other cutting tools used in the manufacture of automobiles have a longer life because the ductility and hardness of the cutting edges is increased by cold treating.

Industries closely related to the automobile field also have found cold treating of metals an efficient means of increasing output and lowering production costs.

FOOD MACHINES

(Continued from page 33)

ern equipment for making all minor and even some major repairs. At each bench there is an air valve for cleaning the parts on which the service man is working. In the case of major repairs that cannot be made in the shop, the part is then returned to the factory where such repairs are made. In the case of hermetic units, no attempt is made to service them in the shop. All are sent to the factory for manufacturer's reconditioning and repairing. These are handled on an exchange basis.

The procedure followed in many shops of taking out the faulty unit of a machine and replacing it with another and then having the unit taken out, repaired and rebuilt for use with some other customer, is followed by this firm. No parts of machines or component parts are taken out, serviced and reinstalled in the same equipment because of the double cost of taking out and re-installing.

The total business of W. B. Haines, Food

Machines is divided as follows: Parts and service about 20% of the gross with sales forming the other 80%. The sales in turn are divided as follows: Refrigeration 60% with the remaining 40% being represented by food machines.

An affiliated business to W. B. Haines, Food Machines is Home Makers, Inc. also owned by Mr. Haines and which deals at retail in refrigerators, home freezers and all sorts of home appliances. This business is confined only to Dayton and is not represented in the other sections of Ohio and Indiana served by W. B. Haines, Food Machines. Two stores are already in operation in Dayton, the principal one being at 620 South Main Street, one of the principal business streets of Dayton. About May 1st another store, the third, will be opened in South Main Street. It is Mr. Haines' idea to ultimately have five retail outlets for the home appliances that Home Makers, Inc. handles. All servicing on equipment sold by Home Makers, Inc. is done from the service shop of W. B. Haines, Food Machines which makes for good service at a minimum of cost both to the firm and to the public.

LOS ANGELES CODE

(Continued from page 36)

Part 49 sets forth the capacity and location of safety devices and further specifies the means for discharge of refrigerants to the atmosphere or to the sewer.

Part 50 specifies the various types of labels and signs for refrigerating equipment and where such signs shall be placed.

Part 51 specifies the required test pressure for various types of refrigerants and the manner of the test.

Part 52 specifies that any refrigerant not contained in a refrigerating system shall be stored in I.C.C. approved containers.

Part 53 relates to cooling towers and specifies that such towers shall comply with the provisions of the Los Angeles Building Code. (Note: Recent amendments to the 1946 Municipal Building Code provide for cooling towers to be built of wood, if desired, and permit cooling towers, water tanks and exterior walls adjacent to open spaces to be of non fire resistant material.)

Part 54 specifies that no person shall sell at retail in the city any unit refrigerator unless the type and construction of such refrigerator shall first have been approved by the Board of Building and Safety Commissioners.

What Control Applications ARE YOUR PROBLEMS?

The following are a few of the many applications on which White-Rodgers Hydraulic-Action controls have been used:

Food freezing
Milk cooling
Air conditioning
Ice making
Water cooling
Food preservation
Industrial refrigeration
Photographic processes
Beer cooling
Fur storage

TYPE 121 /6 heavy-duty, line-voltage Room Thermostat for use with unit cooler and air-conditioning installations. No relay necessary on most applications. Hydraulic-Action.



TYPE 1533 /10 Dual Pressure Control combining in one case, controls for both high-side safety and suction pressure. Cover removed showing uniform calibration of dials.

TYPE 1639 /11 Selective Range Control with visible dial and external lever adjustment. Widely used on vegetable and meat display cases and beverage coolers. Hydraulic-Action.



ON THESE and many other temperature and pressure control applications, which might otherwise have required special controls, White-Rodgers *standard* controls have done the job.

Operated by Hydraulic-Action, every White-Rodgers temperature control is capable of a wide variety of applications—yet each affords ease of installation, exceptional accuracy and dependable performance.

Look for a *standard* White-Rodgers control to handle your special control problem. Write today for air-conditioning and refrigeration catalog and installation data.

WHITE-RODGERS ELECTRIC CO.

ST. LOUIS 6, MISSOURI

Controls for Refrigeration • Heating • Air Conditioning



Refrigeration Service Engineers Society



Official Announcements of the activities of the International Society and Local Chapters appear in this department as well as articles pertaining to the educational work of the Society.

INTERNATIONAL HEADQUARTERS:
433-435 North Waller Ave., Chicago 44, Ill.

California Association, RSES Holds First Annual Meeting

THE first annual business meeting and educational conference of the California Association of the Refrigeration Service Engineers Society was held in Fresno, Cal., at the Californian Hotel, Saturday and Sunday, May 11 and May 12.

With the same enthusiasm and unity of purpose that characterized the preliminary committee meetings previously held, chapter delegates, members of the nine chapters then formed in the state as well as members at large, attended a crowded two-day business and educational meeting.

Friday Evening

On Friday evening the Officers and Directors considered the recommendations of

minor changes in the constitution and by-laws as well as other business matters. The board members and other "early arrivers" had the pleasant experience of meeting informally with Governor Earl Warren of California who indicated his interest in the activities of the association and its membership. Fresno Chapter acted as hosts at a specially planned chapter meeting on Friday evening for the out-of-town members. The program featured a discussion of frozen foods and those present were treated to refreshments including frozen pastry.

Saturday Session

In calling the meeting to order, State President W. W. Allison, Los Angeles, outlined the preliminary work that had been accomplished in the formation of the California Association and emphasized the cooperation that had been given by the officers and participating chapters. Chapters responsible for the state association include Long Beach, Los Angeles, San Diego,

COMING CONVENTIONS

RSES Convention

Place: Hollenden Hotel.

City: Cleveland, Ohio.

Date: October 26, 27, 28, 29, 1946.

Secretary: H. T. McDermott, 433 N. Waller Ave., Chicago 44, Ill.

All Industry Exhibition:

Place: Cleveland Public Auditorium.

City: Cleveland, Ohio.

Date: October 28, 29, 30, 31, 1946.

Exec. Secretary: R. Kennedy Hanson, 1107 Clark Bldg., Pittsburgh, Pa.

Illinois State Association

Place: Stevens Hotel.

City: Chicago, Ill.

Date: September 28, 29, 1946.

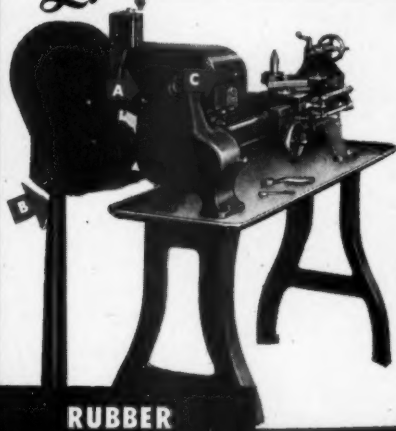
Secretary: R. E. Saunders, 730 Towanda, R.F.D. 1, Bloomington, Illinois.



Officers and Directors meet to discuss association affairs

Logan

A NAME TO REMEMBER WHEN YOU THINK OF BETTER LATHES

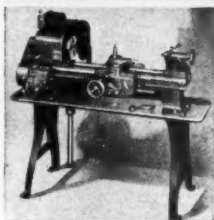


**RUBBER
CUSHIONED
COUNTERSHAFT**

**WHERE FIVE RUBBER
CUSHIONS ASSURE
SMOOTH OPERATION
IN LOGAN LATHES**

- A** → TWO RUBBER CUSHIONED BEARINGS, one at each end of the two hinge points connecting countershaft and headstock.
- B** → ONE RUBBER CUSHION between motor mounting base and pedestal.
- C** → TWO RUBBER BUTTONS cushion the cone pulley guard.

**ABSORBS VIBRATION, GIVES LOGAN
LATHES MAXIMUM SMOOTHNESS AND
ACCURACY IN OPERATION**



**Quick Change
Gear Lathe**

**SPECIFICATIONS COMMON TO ALL
LOGAN LATHES** . . . swing over bed, 10 1/2" . . . bed length, 43 1/2" . . . size of hole through spindle, 25/32" . . . spindle nose diameter and threads per inch, 1 1/2"-8 . . . 12 spindle speeds, 30 to 1450 rpm . . . motor, 1/2 hp, 1750 rpm . . . ball bearing spindle mounting . . . drum type reversing motor switch and cord . . . precision ground ways, 2 V-ways and 2 flat ways.

Rubber cushioning of the countershaft is one of the unique design features which help make Logan Lathes outstanding in smooth, accurate operation. At no point on the Logan Lathe is there a direct metal-to-metal contact between countershaft and headstock. At all three of the countershaft's main support points, the pedestal rod and the two hinge pins, rubber cushions effectively absorb motor vibration. The result is a maximum of smoothness in operation that is conducive to fine precision work. For details on all the Logan advanced design features, see your nearby Logan Lathe dealer, or write direct for Logan Lathe catalog.

K-2-M

LOGAN ENGINEERING CO. CHICAGO 30, ILLINOIS



THREE VIEWS OF THE CALIFORNIA ASSOCIATION MEETING

Top: PRESIDENT ALLISON RECEIVES STATE CHARTER. Standing, left to right: Director Richard M. Oeberst, Sacramento; Director Larry E. Jensen, San Francisco; Director J. Pat Riley, Long Beach; Director James C. Rodgers, Los Angeles; Sergeant-At-Arms Everett Brown, Compton; Assistant Secretary Lloyd Thomas, Gilroy; President W. W. Allison, Los Angeles; 1st Vice-president Rowland F. Cooke, San Francisco; Paul B. Reed, International Educational Committee, Milwaukee; State Educational Chairman W. C. Irving, Santa Monica; Treasurer M. R. Hanks, San Diego; International Secretary H. T. McDermott, Chicago; Director Ralph L. French, San Diego; 2nd Vice-president A. H. Brundage, Fresno. Seated: Mrs. Gerald Kennedy and Gerald Kennedy, State Secretary, Sacramento; Director John Geringer, Fresno.

Center: PARTIAL GROUP ATTENDING EDUCATIONAL SESSION.

Lower: ONE OF THE LUNCHEON MEETINGS WHICH WERE A POPULAR FEATURE.

The "T" Twins

THAWZONE

PATENTED

The PIONEER FLUID DEHYDRANT

THE "T" TWINS
ARE CONGENIAL
COMPANIONS IN
REFRIGERATION
SYSTEMS

TRACE

REFRIGERANT
LEAK DETECTOR

HIGHSIDE CHEMICALS CO.

195 VERONA AVE.

NEWARK 4, N. J.



Governor Earl Warren of California meets informally with a group of members and their ladies.

Golden Gate (San Francisco), Sacramento Valley, Monterey County, and Fresno. Attending the meeting, also, were representatives of two new chapters, organized subsequent to the organization of the state association, Orange County (Santa Ana) and Kern County (Bakersfield).

President Allison introduced International Secretary H. T. McDermott, Chicago, and Paul B. Reed, Milwaukee, Chairman of the International Educational Committee. California State Officers introduced were: Rowland F. Cooke, San Francisco, *1st Vice-president*; A. H. Brundage, Fresno, *2nd Vice-president*; Gerald S. Kennedy, Sacramento, *Secretary*; L. O. Thomas, Gilroy, *Asst. Secretary*; M. R. Hanks, San Diego, *Treasurer*; Everett F. Brown, Compton, *Sergeant-At-Arms*. State Educational Committee—W. C. Irving, Santa Monica, *Chairman*; Lawrence P. Roth, Los Angeles; Olin C. Yates, San Francisco. Board of Directors—John Geringer, Fresno; Richard M. Oeberst, Sacramento; J. Pat Riley, Long Beach; Larry E. Jensen, San Francisco; J. C. Rodgers, Los Angeles; and Ralph L. French, San Diego.

Concluding the morning session, Secretary McDermott formally presented the charter for the State Association, which was accepted by President Allison.

Saturday Luncheon Session

Ted E. Jones of the San Francisco Contractors' Assn. and Laurence K. Brink, Sec'y-Mgr., Los Angeles Contractors' Assn., addressed the convention on the work of their respective organizations. Mr. Brink

commented especially on the cooperation of both organizations and the relationship that has existed over a period of years.

W. C. Irving, State Educational Chairman, presided at the afternoon conference and introduced Paul B. Reed whose talk on "Refrigerated Transport" covered the subject of truck, rail and plane refrigeration. As pointed out by Mr. Reed, the great bulk of perishables is transported at present by rail, but truck refrigeration is showing considerable advancement. The maintenance of refrigeration equipment in trucks will require the service of refrigeration service organizations, especially as the haulage of frozen foods increases.

M. L. Combs, production manager of Longhead Frozen Foods, Inc., Fresno, provided practical information on the care necessary in the processing of frozen foods and their handling under refrigeration until they reach the consumer's table.

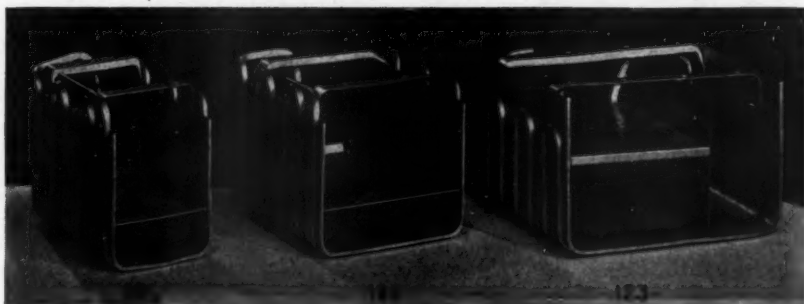
W. L. Holladay, Chief Engineer for Airtopia Dist. Inc., a division of Drayer-Hanson, Los Angeles, gave the convention a practical discussion on "Airtopia," claimed to be the "first completely automatic self-contained unit to furnish all '6' essentials for comfort heating and cooling." Airtopia, claimed Mr. Holladay, is the answer to the use of the reverse cycle of refrigeration for heating and cooling.

Saturday Evening Entertainment

Members and their guests enjoyed an evening of fun at the "Motel" El Rancho, one of Fresno's better known entertainment spots.

(Continued on page 68)

USED DRY EXPANSION **★ ALUMINUM EVAPORATORS ★**



4½ to 5 Cu. Ft.

5½ to 6 Cu. Ft.

6½ to 7 Cu. Ft.

Replacement evaporators for Kelvinator, Stewart Warner, Copeland and other brine tank units. Each evaporator thoroughly cleaned and completely refinished like new. Has 6" copper tube inlet and outlet lines for easy flare connections. Complete with built-in shelves.

Note: Model No. 123 equipped with two freezer compartments. Shelf dimensions 9" wide x 3½" high x 10" deep. Bottle compartment dimensions 12" deep x 9" wide x 4½" high.

NO.	WIDTH	HEIGHT	DEPTH	NET EACH
121	6½"	9"	12"	\$8.50
122	9¾"	9"	12"	\$8.50
123	15"	9"	12"	\$11.00

SPECIAL DISCOUNT of 10% in LOTS of 25 or MORE—F. O. B. CHICAGO

Immediate delivery on all items listed



MULLINS FLOAT

Completely overhauled and fully guaranteed. Immediate shipment from our large stock. Available with or without valves in header.

NET EACH

With valves in header... **\$4.95**

Without valves **4.25**

SPECIAL DISCOUNT of 10% in LOTS of 25 or MORE—F. O. B. CHICAGO

ACME REFRIGERATION PARTS CO.

5217 W. Madison St.

Telephone
Columbus 4141

Chicago 44, Ill.

SERVICE ENGINEER

65

June, 1946

Educational Sound Films Schedule of Showings

UNDER the supervision of the International Educational Committee, a set of 16 sound films, grouped into 12 showings and accompanied by a set of slides, are being circulated among chapters as a part of their educational program. Films are all of a practical nature on servicing refrigerating systems. Titles of the films and their identifying numbers and the schedule of showings are listed.

Film Titles and Key Numbers

No.	TITLE
360	Principles of Refrigeration
438	Checking The System—Part I
439	Checking The System—Part II
440	Locating and Repairing Leaks
441	Adding or Removing Refrigerant
442	Removing and Installing A Compressor or Condenser
443	Removing and Installing A Cooling Unit
444	Adjusting and Checking The Expansion Valve
445	Checking and Replacing A Float Valve
446	Checking The Electrical System
447	Quieting A Noisy Refrigerator
448	Adjusting and Repairing The Thermostatic Expansion Valve
451	Servicing Water Cooled Condensers
449	Adjusting Pressure Actuated Temperature Controls
450	Adjusting Commercial Thermostatic Controls
452	Making and Repairing Tubing Connections

Schedule of Showings

AKRON, OHIO—Akron Chapter: July 10—No. 442. Contact F. J. Roller, 357 S. Maple St., Akron 3, Ohio.

AURORA-ELGIN-JOLIET, ILL.—Tri-County Chapter: June 15—No. 440-441. Contact William J. McCarley, 607 N. Center St., Joliet, Ill.

BATON ROUGE, LA.—Louisiana Chapter: July 5—No. 442. Contact E. A. Summer, 3867 N. 33rd St., Baton Rouge 5, La.

BLOOMINGTON, ILL.—Corn Belt Chapter: July 10—No. 446. Contact Harold Mason, 306 W. Wood St., Bloomington, Ill.

CHARLESTON, W. VA.—Charleston Chapter: July 9—No. 440-441. Contact H. G. Frame, 1105 Washington St. W., Charleston 2, W. Va.

CHICAGO, ILL.—Chicago Chapter: July 9—No. 443. Contact D. D. Orr, 332 S. Hoyne Ave., Chicago, Ill.

COLUMBUS, OHIO—Columbus Chapter: July 10—No. 443. Contact H. Grossman, 22 W. Naghten St., Columbus, Ohio.

DAVENPORT, IOWA—Mississippi Valley Chapter: July 2—No. 444. Contact J. Vinje, 529 W. Second St., Davenport, Iowa.

DAYTON, OHIO—Dayton Chapter: July 11—No. 444. Contact R. E. Warner, % Allied Supply Co., 359 W. Monument Ave., Dayton, Ohio.

DENVER, COLO.—Mile High Chapter: June 17—No. 442; July 15—No. 443. Contact R. C. Kimmel, 1524 15th St., Denver 17, Colo.

DUBUQUE, IOWA—Key City Chapter: July 3—No. 443. Contact R. E. Mueller, Stamper Farm & Home Store, 7th & Iowa, Dubuque, Iowa.

EVANSVILLE, IND.—Evansville Chapter: June 27—No. 440-441. Contact C. E. Goad, 11 Main St., Evansville, Ind.

FORT WORTH, TEXAS—Cow Town Chapter: July 11—No. 440-441. Contact P. D. Cato, Texas Refn. Supply Co., 1410 Commerce St., Fort Worth, Texas.

FRESNO, CALIF.—Fresno Chapter: July 11—No. 360. Contact N. N. Leas, % Cond. Air. & Refn. Co., 249 N. H St., Fresno 3, Calif.

GRAND RAPIDS, MICH.—Furniture City Chapter: July 2—No. 443. Contact M. D. Thiebaut, % Consumers Power Co., 450 Market S.W., Grand Rapids, Mich.

HUNTINGTON, W. Va.—Tri-State Chapter: July 9—No. 442. Contact A. W. Albertsen, 314 Eleventh St., Huntington 14, W. Va.

KANSAS CITY, MO.—Kansas City Chapter: July 3—No. 440-441. Contact C. R. Visger, 7715 Brooklyn, Kansas City, Mo.

LANSING, MICH.—Wolverine Chapter: June 24—No. 443. Contact R. Kellogg, 616 Jessop Ave., Lansing, Mich.

LOGAN, UTAH—Utah Aggie Chapter: July 3—No. 448-451. Contact J. Cecil Sharp, % Utah State Agricultural College, Logan, Utah.

LONG BEACH, CALIF.—Long Beach Chapter: July 10—No. 438-439. Contact Van's Supply, 250 E. 12th St., Long Beach, Calif.

LOS ANGELES, CALIF.—Los Angeles Chapter: June 26—No. 360. Contact Merle F. Stutzman, 3464 W. First St., Los Angeles 4, Calif.

LOUISVILLE, KY.—Colonels Chapter: June 20—No. 443. Contact J. M. Berry, % F. H. Langsenkamp Co., 339 W. Main St., Louisville 2, Ky.

MADISON, WIS.—Madison Chapter: July 11—No. 443. Contact Ref. Maintenance Corp., 731 University Ave., Madison 5, Wis.

MIAMI, FLA.—Greater Miami Chapter: June 27—No. 360. Contact Orville W. Brown, 1044 N. W. 65th St., Miami 38, Fla.

MONTGOMERY, ALA.—Montgomery Chapter: June 17—No. 440-441. Contact W. C. Goodwin, 8 Forest Ave., Montgomery, Ala.

NEW HAVEN, CONN.—Elm City Chapter: July 3—No. 440-441. Contact T. B. Howell, United Illuminating Co., 221 George St., New Haven, Conn.

OMAHA, NEBR.—Missouri Valley Chapter: No Meetings June, July & August. Contact C. M. Flohr, % United Motors Serv., 27th Ave. & Harney St., Omaha, Nebr.

PEORIA, ILL.—Illinois Valley Chapter: July 12—No. 438-439. Contact Bryson Roth, 300 South Washington St., Peoria, Ill.

READING, PA.—Reading Chapter: June 18—No. 438-439. Contact O. A. Larson, % Larson Supply Co., 326 Buttonwood St., Reading, Pa.

ROCKFORD, ILL.—Rockford Chapter: June 17—No. 443. Contact L. L. Sturch, 1915 Vernon St., Rockford, Ill.

SACRAMENTO, CALIF.—Sacramento Valley Chapter: July 3—No. 438-439. Contact George M. Bale, % Assoc. Refr. & Equip. Co., 1717 Eye St., Sacramento 14, Calif.

ST. PETERSBURG, FLA.—Sunshine City Chapter: July 2—No. 360. Contact R. B. Schroeder, Florida Power Corp., St. Petersburg 1, Fla.

GENUINE FACTORY REBUILT UNITS



\$39⁹⁵

ALL MODELS
EXCEPT "C"

GUARANTEED 6 months
One-week service!

Send in your old unit board. Just unfasten suction and liquid line, loosen the bolts holding the board and ship complete. All we ask is that the pumps are in fair shape and all parts are with them.

**ALL GENUINE GRUNOW PARTS
STILL AVAILABLE**

Stators—thermostats—relays—meters—
condensers—electrolytic condensers.

Grunow

AUTHORIZED SERVICE, INC.

4313 W. Fullerton Avenue, Chicago 39, Illinois

FACTORY TESTED PARTS

"CHEXIT" *Replacement check*
PATENT PENDING
valve for

COLDSPOT

THAT WILL NOT LEAK

INSTALL IN 5 MINUTES
NO CUTTING OR FLARING

PRICE **2⁵⁰**

ASK YOUR JOBBER OR ORDER DIRECT
R. ROBINSON

425 VAN SICKLEN AVE.

BROOKLYN 7, N. Y.

SALT LAKE CITY, UTAH—Beehive Chapter: June 27—No. 442. Contact W. W. Walker, % G. E. Supply Corp., 310 W. 2nd South St., Salt Lake City, Utah.

SAN DIEGO, CALIF.—San Diego Chapter: June 20—No. 360. C. E. Anderson, 209 West E St., San Diego 1, Calif.

SCRANTON, PA.—Scranton Chapter: July 3—No. 449-450. Contact W. D. Franklin, 1632 Sanderson Ave., Scranton 9, Pa.

SPRINGFIELD, MASS.—Western Massachusetts Chapter: June 25—No. 438-439. Contact Harold C. Lambert, Room 449, 31 Elm St., Springfield 3, Mass.

TOLEDO, OHIO—Greater Toledo Chapter: July 10—No. 360. Contact Paul D. Sizer, P.O. Box 69, 1216 Adams St., Toledo, Ohio.

TULSA, OKLA.—Oil Capital Chapter: June 26—No. 443. Contact R. W. Palmer, 820 E. 3rd St., Tulsa 3, Okla.

WATERLOO, IOWA—Cedar Valley Chapter: June 26—No. 442. Contact J. Adams, % Herbert Refr., 719 Lafayette St., Waterloo, Iowa.

WILKES-BARRE, PA.—Wyoming Valley Chapter: July 8—No. 445. Contact A. Reese, 104 Slocum St., Forty Fort, Pa.

§ § §

ORANGE COUNTY GETS CHARTER

MEMBERS of Orange County Chapter, assembled at Santa Ana, California, May 8, to receive their charter from International Secretary H. T. McDermott. The chapter has 31 charter members. Repre-



President Merle A. Soden, Anaheim, Calif., and officers, receive charter for Orange County Chapter from International Secretary H. T. McDermott

sentatives from Los Angeles, Long Beach and San Diego chapters joined in welcoming the newest California chapter into the association. International Director and California State Association President W. W. Allison extended a cordial invitation to the chapter to participate in the activities of the newly formed state association. President Soden responded to the invitation on behalf of the chapter.

CALIFORNIA ASSOCIATION

(Continued from page 64)

Sunday Session

An inspiring address by Jesse L. Blair, Instructor at the Frank Wiggins Trade School, Los Angeles, opened the general session on Sunday. Mr. Blair stressed the importance of the individual member participating in the chapter programs.

Committee reports were presented by Treasurer M. R. Hanks; Educational Chairman W. C. Irving; and 1st Vice-president R. F. Cooke on the proposed code for San Francisco.

In honor of the tenth anniversary of the formation of Long Beach Chapter in 1937, the California Association will hold its second annual meeting in that city in May, 1947.

R.S.E.S. Chapter Notes

● **AKRON CHAPTER, Akron, Ohio, May 8**—The business meeting was suspended in lieu of the films Nos. 438 and 439, accompanied by slides and a discussion period which consumed the entire meeting time. Sixty-two members and guests were present.

● **BEEHIVE CHAPTER, Salt Lake City, Utah, Apr. 26**—Reorganization of the chapter was completed with the election of new officers who are as follows: J. Ferrell Craner, President; A. E. Greetham, First Vice-president; Theo. W. Beck, Second Vice-president; H. Lavell Whatcott, Secretary; Geo. W. Olsen, Treasurer; and Edwin Hansen, Sergeant-at-Arms.

● **BOSTON CHAPTER, Boston, Mass., May 14**—This date was devoted to the annual banquet and ladies' night and no business was discussed. The evening started out with an enjoyable dinner and an orchestra provided music for dancing until midnight.

● **CHARLESTON CHAPTER, Charleston, W. Va., May 14**—Six new applications for membership were received during the meeting, and among announcements was one by Harry Frame reporting on the arrangements made for the charter presentation night. C. Buschkopf, Acting President of the International Society, is scheduled to make the presentation and a banquet is arranged to commemorate the occasion. Various out-of-town guests and members of near-by chapters are being invited. The presentation meeting will be held June 11.

● **CLEVELAND CHAPTER, Cleveland, O., Apr. 9**—On the educational program Frank Carter presented a wire recording, accompanied by slide films, of the development of the expansion valve. This was the history of the Detroit Lubricator expansion valve from its beginning to and including the pressure temperature valve for low temperature work. Also on the educational program, Mr. Halstead discussed water cooled condensers, particularly the shell and tube type. Mr. Halstead, who is of the firm Halstead and Mitchell, Pittsburgh, Pa., answered many questions following his talk.

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FOR ALL THOSE PIPE INSTALLATION AND
REPAIR JOBS—Always Ready for Instant Use

ECONOMICAL - HANDY - CLEAN

NO MESS - NO BRUSH
NO WASTE



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- Withstands Freon, methyl chloride, butane, propane and other refrigerants, oil, air, water, brine, etc.
- Lubricates and completely seals pipe joint threads, nuts, bolts, gaskets, turnbuckles, etc.
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We have stepped up production on this little "throw-away" B. S. & B. SAFETY HEAD rupture disc relief device—widely favored for leak-proof pressure protection at low cost. Shipped from stock with the following specifications.

Body (Brass)

Inlet		Outlet	
1/4"	Male NPT	3/8"	SAE Flare
3/8"	Male NPT	1/2"	SAE Flare
1/2"	Male NPT	1/2"	Male NPT

Rupture Disc (Factory Installed)

Aluminum Vinylite Coated—150 to 500 lbs.
Silver—250 to 500 lbs.

On an order for 100 or more identical Midgets we will assemble any combination of the above listed connections.

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● **COLONELS CHAPTER, Louisville, Ky., Apr. 18**—The evening started off with a showing of films Nos. 440 and 441, entitled "Locating and Repairing Leaks" and "Adding or Removing Refrigerant." This was followed by a showing of films by Paul Dompke of the Mueller Brass Co., speaker of the evening, who gave an interesting talk on the products manufactured by Mueller Brass Co. He further illustrated his talk with cut away samples of various valves. Following this talk Mr. Dompke conducted a soldering contest. Winners of the contest were Al Myers, 1st prize; H. T. Hood, 2nd prize. Judges were Paul Dompke, H. C. Moore and Bob Berry. Refreshments were served following the meeting.

● **DAYTON CHAPTER, Dayton, Ohio, Apr. 11**—The secretary of the steamfitters association was a guest of the evening and the discussion became quite lengthy on the proposed city code. The two films, "Locating and Repairing Leaks" and "Adding or Removing Refrigerant" were shown on the educational program. On April 25 the educational program featured a talk by Messrs. Dunlap and Spielman of Ranco, Inc., on products manufactured by that company.

● **ELM CITY CHAPTER, New Haven, Conn., Apr. 5**—Walt Barbour and Jack Strauss, Detroit Lubricator Co., presented three sound films on the subjects of "principles of refrigeration," "servicing automatic expansion valves," and "servicing thermostatic expansion valves," all of which took some of the mystery out of these devices and showed quite clearly why they sometimes go dead. Buffet lunch was served after the meeting. On April 25th the chapter held its annual dinner dance and ladies' night. An appetizing steak dinner started off the festivities, followed by a humorous floor show and completed by dancing to the music of Worthy Hills orchestra. On May 3rd returns to the annual election of officers were announced as follows: Raymond H. Clouet, *President*; Wm. J. Paine, *First Vice-president*; Thomas B. Howell, *Second Vice-president*; Joseph A. Berg, *Treasurer*; Ralph F. Rice, *Secretary*; Alfred J. Montesanto, *Sergeant-at-Arms*; Lester Harris, *Chairman Educational Committee*. Board of Directors—Arthur S. Murphy, Lee J. Wallace, John T. Bendel. Plans for the certificate membership examination were completed and some discussion held on the assistance the chapter could give in the writing of a city code.

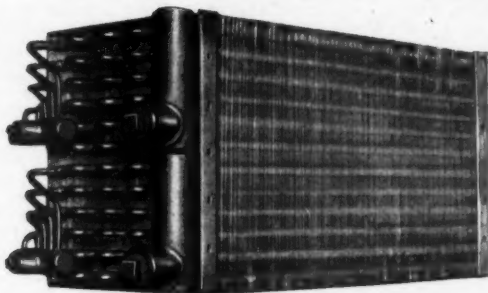
At a recent meeting held by the St. Louis Chapter, 450 servicemen of the area were in attendance to see a demonstration of the new Hussman Open Self Service Frozen Food Display Refrigerator. The refrigerator was in full operation for the demonstration and the entire educational program of the evening was devoted to it. The view at the left is visual indication of the interest displayed.

This new development in equipment for the display of frozen foods, according to Hussman engineers, is in answer to the trend of modern food merchandising which is going over to self service type of equipment.

FIN COILS



Coil shown: Integral liquid header. Finger feeds to circuits. Common suction header for return of refrigerant gas.



For all types of commercial or industrial low temperature installations. To your specifications. Sizes to 16 ft. lengths.

Copper tube with aluminum fins, or all steel, hot galvanized. Use with any refrigerant, or liquid cooling medium.

All coils tested to 400 lbs., and dehydrated before shipment.

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● **FAIRFIELD COUNTY CHAPTER, Fairfield County, Conn., Apr. 8**—The entire evening was devoted to business matters of the chapter, among which was the appointment of five members on a committee to arrange an outing for the chapter.

● **FOX RIVER VALLEY CHAPTER, Fond du Lac, Wis., May 1**—Tom Lester of Kold-Hold Mfg. Co. demonstrated the construction and application of products of his company. His information on various methods of connecting banks of coils proved most enlightening.

● **HEAD OF THE LAKES CHAPTER, Superior, Wis., Apr. 1**—This was the charter presentation night for the chapter and the meeting was presided over by Robert Rooney, president of the chapter. After a brief business meeting, Art Palen, International Director and member of the Twin Cities Chapter who helped to form this new chapter, talked on the future of RSES. Mr. Palen then introduced C. Buschkopf, International Acting President, who presented the charter. Mr. McCafferty, of the Refrigeration & Industrial Supply Co. of Minneapolis, was the guest speaker who outlined his ideas about how best to benefit from membership. Luncheon was served following the meeting.

● **KANSAS CITY CHAPTER, Kansas City, Mo., May 1**—J. D. Merkle of Ranco gave a complete picture on the sources of trouble and application of household and commercial controls. His talk was followed by a round table discussion which occupied some time. Following this discussion the film "Installing Compressors and Condensers" was shown.

● **LA CROSSE CHAPTER, La Crosse, Wis., May 3**—The greater part of the evening was devoted to business matters of the chapter, during which it was decided to make arrangements for the showing of the series of films provided by the International Society. All servicemen in the area are to be invited to attend the showing of these films. On the educational program the discussion included methods of soldering and brazing, difficulties and remedies of compressor repairing, and relative values of various dehydrating agents.

● **METROPOLITAN NEW YORK CHAPTER, West New York, N. J., May 10**—After the business session the educational committee presented the program entitled "Information Please" which proved interesting and informative to everyone.

● **OIL CAPITAL CHAPTER, Tulsa, Okla., Apr. 19**—Ralph E. Bray, Howard J. Clark and Weldon Howard were accepted to membership. Winner of the sweepstakes was Mr. Karr. The educational program included the showing of a sound film.

● **SACRAMENTO VALLEY CHAPTER, Sacramento, Calif., Apr. 4**—The meeting was devoted almost entirely to business discussion, during which time two new applications for membership were received and four new members were accepted to membership. One of the main discussions of the evening was on the proposed city code for the city of Sacramento.

● **SAN DIEGO CHAPTER, San Diego, Calif., Apr. 18**—K. H. Young, vice-president presided at this meeting in the absence of President Wampler, who recently suffered a heart attack. All of the large number of members and guests present were glad to learn that

"Wamp" was well on the road to recovery at that time. Incidentally, this was the first meeting that Wampler had missed in three years. Several guest speakers were introduced, among them Peter Askew and Walter Hilton of Thermal Products, Inc., Wm. Kettering of the Claude Michaels Sales Agency, Wm. Remark of Nash Kelvinator, Mr. Carse of Linde Air Products and John Ross of Handy and Harman. Mr. Ross gave an interesting demonstration of brazing and welding of numerous types of metals. Coffee and doughnuts were served after the meeting. On May 16th, A. Ross Campbell, instructor of the Adult Educational Class at Sweetwater Union High School and ten members of his class were in attendance at the meeting. John Schlemmer of General Controls, San Francisco, explained the theory of modern refrigeration in detail and illustrated his talk with a glass evaporator.

● **SOUTHERN OHIO CHAPTER, Portsmouth, Ohio, Apr. 9**—Business was given the go-by this evening in favor of a fish fry and accompanying refreshments. There were thirteen members present.

● **TRENTON CHAPTER, Trenton, N. J., May 15**—On the educational program the meeting was turned over to the educational committee for a half-hour service problems discussion which proved very lively and informative. This was followed by the presentation of S. Charles Segal of Kramer Trenton Co. Mr. Segal gave a talk on the Kramer "Thermobank."

● **TWIN CITIES CHAPTER, Minneapolis, Minn., Apr. 5**—This was a dinner meeting and business was dispensed with. The speaker of the evening, Dr. R. C. Jordan, introduced by Don Frank, spoke on the subject of refrigerants. It was an interesting talk, covering the whole family of commercially used refrigerants and dealing with their effects on food, explosive properties, toxicity, critical temperatures and various other related subjects. The talk was given with the aid of slides to illustrate, and a rather lengthy question period followed.

● **WESTERN MASSACHUSETTS CHAPTER, Springfield, Mass., Apr. 9**—Completion of a reference library was announced at this meeting, started by C. P. Paysons with many books and manuals contributed by members of the chapter. The library is open to all members. On April 21st, Earl Jenning of Temprite Products Company, Detroit, Mich., presented a number of cut-away models of Temprite coolers and explained the operation, application, installation and maintenance of the equipment. 150 members and guests were in attendance, some of whom were students from nearby schools.

● **WICHITA CHAPTER, Wichita, Kans., May 3**—R. N. Meyer, Alco Valve Co., St. Louis, Mo., exhibited their new glass evaporator built by Alco Valve, to demonstrate the action of their valves. An interesting highlight of the talk given by Mr. Meyer was the explanation of their new thermo-limit expansion valve. On May 5th members were entertained by the ladies of the chapter with a steak fry and wiener roast, held in one of the local parks. A baseball game and games for the children were the main attractions for the afternoon.

CABINET DRINKING WATER COOLERS



Glass filler or bubbler coolers are available with capacities up to 25 gallons per hour. Cabinet of heavy steel welded construction with white baked enamel surface. Also available now — normal and high suction pressure water coolers for commercial use.

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More and more refrigerator repair men are turning out top servicing jobs with these versatile soldering tools, that are more than just ordinary soldering irons — they are handy electrical soldering tools designed to handle hard and soft soldering — soldering terminals, lugs, delicate wiring, spot soldering, soldering cop-



per tubing. Ideal for working in close quarters. IDEAL "Thermo-Grips" do a better job—quicker! The part touched heats almost instantly. Safe—no pre-heating or open flame hazard. Wide variety of attachments to choose from, for every kind of soldering work.

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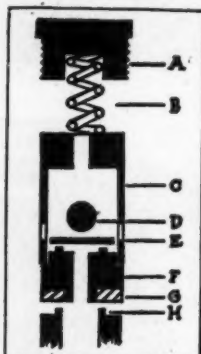
New and Improved Appliances

Addresses of Manufacturers represented in this department can be obtained from the Editor

"Chexit"

CHEXIT is a new check valve assembly designed as a replacement for all models of the Coldspot and Bohn refrigerating units employing the fibre coupling drive. It is manufactured by R. Robinson, Brooklyn, N.Y.

Advantages claimed for it are: (1) Fits all models. (2) Self-centering—requires no alignment. (3) Saves time—takes only five minutes to install. (4) Reduces labor cost.



Check Valve for Coldspot

The Chexit is simplicity itself—any inexperienced helper can install the Chexit. (5) Easy to install. No special tools are required to install the Chexit. (6) Will not leak. Under actual testing conditions the Chexit has withstood pressures up to 250 lbs. without any sign of leakage. (7) Ready to install. It is not necessary to lap, polish, grind or otherwise alter the original worn seat. (8) No chatter. The Chexit is quiet in operation. (9) Inexpensive. A Chexit installed on every job is worthwhile insurance against costly call-backs. (10) Durable construction. Special process steel and precision

machining assures long life and smooth and foolproof operation. (11) Guaranteed. The Chexit is guaranteed against defects in materials and workmanship. The Chexit does the job so well that it challenges breakdown.

Instructions for installing, included with the valve, state: After evacuating the unit—(1) Remove the plug "A" and the original disc, ball weight, valve cage and spring. (2) Drop the original ball "D" into the valve cage "C" and put the new disc "E" into place. Press the replacement seat "F" into the cage housing firmly. (3) Apply a slight amount of vaseline on both sides of the Neoprene gland "G" before assembling. (4) Dip the entire assembly into clean refrigeration oil. (5) Push the assembly down the compressor check valve housing firmly so that the Neoprene rests against the old seat "H." Replace the original spring "B" and plug "A."

Pipe Insulation

A NEW development is said to stop sweating and dripping from cold water pipes easily and quickly. This product, known as Mystik Self-Stik Dri-Pipe, is a patented insulation which permanently prevents condensation under

warm, humid conditions by forming a sheath-like jacket around the pipe. Installation is simplified because of the "Self-Stik" edges on the product with which it is fastened lengthwise to the pipes. No tools other than a pair of scissors are needed. Once Dri-Pipe is installed, no painting or other covering is required. Its outer backing is a moisture-proof, resinous-coated cloth which prevents dampness from damaging the soft-pliable insulating material. According to the manufacturer, Mystik Adhesive Products of Chicago, DRI-PIPE has been thoroughly tested and proved to stop condensation on cold water pipes under usual conditions. DRI-PIPE also can be used for cold air ducts and tanks.

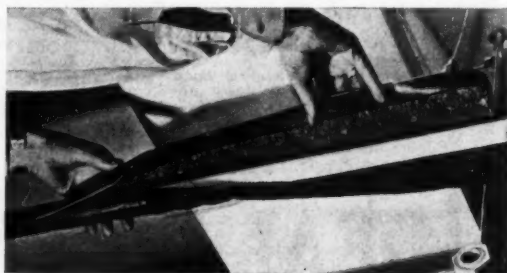
Flexible Shaft Tool

A HANDY, portable Flexible Shaft Utility Tool capable of getting into small corners and tight places, is now in production as announced by its manufacturer, The Dumore Company.



Dumore flexible shaft

Weighing but 8 pounds, its portability stems from the fact that the 1/15 hp. motor needs only to be hung on any convenient hook, connected to an outlet and it's ready to operate. This makes it an



Showing the method of applying Self-stik Dri-Pipe

**HOME-PROVEN
BY THOUSANDS**

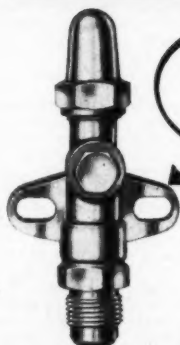
Many QUICFREZ Farm Locker Plants have
already been in use for over 6 years.

Quicfrez is built to last

SANITARY REFRIGERATOR CO.
Fond du Lac, Wisconsin

**SANITARY
Quicfrez**

Another **SUPERIOR FIRST**



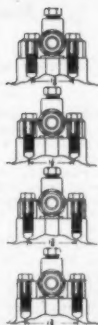
The "UNI-HOLE" Flanged Compressor Valve

Has Universal bolt holes for use with 5/16" bolts or cap screws, to facilitate installation on compressor flanges having 1-3/8", 1-1/2", 1-5/8", or 1-3/4" centers.

Simply install the "Uni-Hole" Valve in its proper position . . . add the two heavy washers (supplied with each valve) between the flange and bolt, or cap screw head . . . then tighten. That's all there is to it!

Ask your jobber to show you the SUPERIOR "Uni-Hole" Flanged Compressor Valve. You're sure to like it! It's a natural . . . and besides saving you installation time, it reduces your stocking problem. *One size does the work of four!*

The diagrams at the right tell the story.



BB-132 A.

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"on the job tool" wherever normal electric current is available.

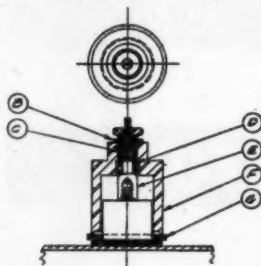
This Flexible Shaft Utility Tool is equipped with a No. 0 balanced Jacobs chuck to handle all drills, grinding wheels, buffers, and countersink bits with shanks of $\frac{1}{8}$ " diameters or less.

Shaft is $3\frac{1}{2}$ " inches long, and normal speed for the handpiece is 500 to 3000 rpm., at gear reduction end. If desired, power may be taken off the other end of the motor for direct drive speeds of from 3000 to 10,000 rpm. Speed is controlled by a handy foot rheostat.

Further information will be sent by the manufacturer, upon request.

Terminal Sealing Cap

THE new Holl-ins Dome Sealing Cap is a new device designed to seal leaks at the terminals of Crosley hermetic units. It can be used on all Crosley units from 1937 to 1941, inclusive.



Sealing Cap for Crosley Terminals

B—Bakelite washer (now replaced with bakelite cap covering end of stud).

C—Hard fiber expander.

D—Neoprene bushing.

E—Terminal stud extension.

F—Sealing cap.

G—Neoprene washer.

Installation of the sealing cap is simple and can be accomplished in the field without further loss of refrigerant and with no tools except a small socket wrench. Instructions for installing are:

1. Install threaded extension bolt onto dome terminal stud seating it firmly.

2. Place the small neoprene rubber bushing against the shoulder of the extension bolt.

3. Place the small fibre

bushing directly behind the rubber bushing.

4. Place the large neoprene rubber washer against the flanged shoulder of the dome housing from which the terminal extends.

5. Place the metal sealing cap over the dome terminal as in a sleeve-like manner and seat it snugly against the large neoprene rubber washer.

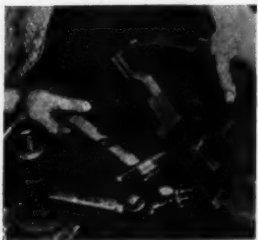
6. Place the bakelite insulating cap on the extension bolt behind the sealing cap.—Followed by the metal washer, lock washer, and nut.

7. Adjust the sealing cap by hand until the face of the cap is seated firmly and accurately against the large neoprene rubber washer. By taking up on the nut with a spin-tite wrench a perfect seal is assured.

"Kant-Mar" Hammer

A NEW hammer for mechanics with an unbreakable "CASTEX" (hard plastic) double-head that will not mar flat surfaces of metal has been announced by the Schmidgall Manufacturing Company.

The "KANT-MAR" has a wide application. It fills a special need in machine shops, tool rooms, repair shops, electrical shops, automotive and all types of industrial and service organizations. It is particularly useful on flat metal surfaces where marks, dents and blemishes on dies and fixtures must be avoided.



Kant-Mar hammer

It is durably constructed—yet light in weight and correctly balanced. The head is die cast—Non Breakable, fire proof—acid proof, non conducting material. The base of the head is accurately machined from special light weight aluminum alloys, se-

curely fastened to the head but interchangeable. The handle is high grade hickory.

The "KANT-MAR" hammer has been given severe tests under actual working conditions. It is guaranteed for life. Each hammer is registered with the manufacturer and will be put in good condition at any time for 50c to help cover handling and shipping charges.

"Reynalite"

W. G. REYNOLDS, vice president of the Reynolds Metals Company announces the development of "Reynalite," a lightweight, high-strength, economical aluminum building material which can be produced in large quantities.

One of many new products in Reynolds postwar program, Reynalite combines two sheets of aluminum, bonded with a plastic adhesive, to a cellulose core to form an attractive panel which possesses permanent rigidity, thwarts harmful elements, is easily worked and is adaptable to scores of major uses in building construction and related fields. It is impervious to moisture and to temperature changes.

Any design specification can be met with Reynalite because a wood veneer surface can be bonded to either of the metal surfaces, or both.

"Tests have shown," said Mr. Reynolds, "that Reynalite has all the long-life qualities of seasoned lumber plus advantages which come only in a combination aluminum-core of this type."

Made available after months of study and experimentation by Reynolds research scientists, Reynalite has proven itself to be ideal for the construction of walls, ceilings, roofs, interior panels, doors, cabinets, partitions and other building parts. It can be used, too, for stairways, refrigerator linings, overhead garage doors, electrical cabinets, junction boxes, medicine cabinets, elevator cabs, telephone booths, radiator covers, clothes hampers, tool chests, air ducts and heat ducts. This adaptability has been quickly seized by the furniture industry for use for table tops on occasional tables, coffee tables and end tables. The heat-conductive property of aluminum reduces to a minimum,

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Heavy Duty • Rechargeable •
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STOPS LEAKS INSTANTANEOUSLY IN
CROSLEY DOME TERMINAL CERAMICS

A Sealing Cap recently introduced has received instantaneous and nationwide acceptance - made of aluminum with precision fit accuracy assuring a leak-proof seal.

Among its outstanding features.

- 1—Leak proof sealing action
- 2—Simplicity of installation. May be installed without removing unit from cabinet.
- 3—Adaptable to all Crosley hermetic sealed type units from 1937-1941.
- 4—Chemically resistant construction.
- 5—Installed by ordinary hand tool.

A trial order will convince you - sold with a money back guarantee at the introductory price of

\$3.50 per set

Special prices for volume orders.

HOLL-INES DISTRIBUTING COMPANY
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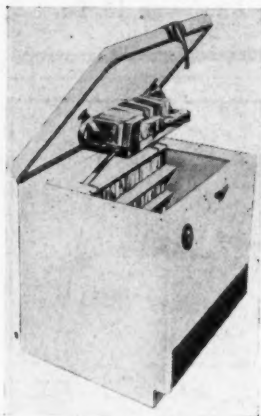
and, in many cases eliminates entirely, the danger of scorch or burn marks caused by matches or ashes falling onto a table top.

Along with its other virtues, Reynalite is uniform in quality, has high insulating value, resists lighting and fire, is insect proof.

Reynalite can be fastened with usual-type nails or screws and is worked with ordinary carpenter tools. It can be cut equally as well on wood-working or metal-working equipment.

Orley Freezer

A DEPARTURE from conventional home freezers is announced by Orley Bros., Detroit, manufacturers of the new Orley Freezer which introduces the "speed-flo" principle of coolant action for freezing and storage in a single unit, with the added distinction of the magic "Handeez-Tray" which swings into position as the lid is raised.



Orley Freezer

The Orley Freezer with a five cubic foot capacity provides 8½ square feet of horizontal prime freezing surface and 14½ square feet of overall prime freezing surface. The "speed-flo" principle of coolant action, according to the manufacturer, assures rapid "sharp freezing." "No coil" aluminum type evaporator is used. No defrosting necessary. Special "moisture-mizer" prevents accumulation of moisture throughout cooling system.

Space Air Conditioner

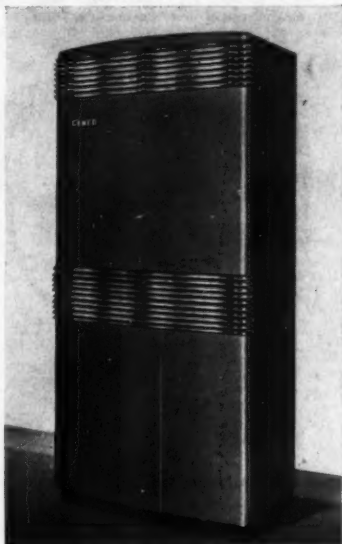
A NEW space air conditioner enclosed in a modern design cabinet is now being produced by the General Engineering and Manufacturing Co., St. Louis. This unit was designed with the idea of accomplishing four definite results: Adequate circulation of air, complete purification of the air, proper cooling of the air, and, lastly, dehumidifying of the air.

The new units are totally enclosed and arranged for stage cooling. When less cooling is required, only two cylinders will pump and in this way capacity is cut to 50 per cent until more cooling is required when the thermostat again brings all cylinders into pumping action. The compressor starts half capacity and cuts to full capacity after about one minute's run.

The cabinet is equipped with bright finish special grills. The outlet grill is equipped with directional vanes and is so made that air can be delivered at different outlet velocities for short or long room coverages. The blower is of large size and the five-ton unit delivers 2200

cfm., and the three-ton unit delivers 1500 cfm. air. The top section can be removed for duct connection.

The heating coils are optional, using hot water or low pressure steam. There are



General Engineering and Manufacturing Co., Air Conditioner

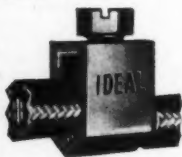
nine new features included in this space cooler, some of them have patents applied for.

The cabinet measures 23½ x 39½ x 85½ in. high. The weight of the five-ton unit is 850 lbs. and of the three-ton 772 lbs.

Split Bolt Connectors

TO SUPPLEMENT their line of wire connectors and lugs, Ideal Industries, Inc., 1568 Park Avenue, Sycamore, Illinois announces the development of a new line of split bolt connectors and service entrance connectors.

The split bolt connectors are available in two types, "one piece" and "two piece" with small and large heads. They are also available either in bronze, brass, or aluminum. These connectors are precision made from high quality ma-



terial. Uniform contact surfaces assure maximum conductivity and low resistance. A wide range of sizes accommodate all solid and stranded wire from No. 6 to 1,000,000.

Your **BIGGEST** Dryer Value!

**STURDY
STEEL CON-
STRUCTION**

ONE-PIECE SHELL

GASKETED JOINTS



REMOVABLE
50-MESH
INLET SCREEN

REMOVABLE
100-MESH
OUTLET SCREEN

**IMPROVED
MODERN
DESIGN**

- ✓ One-Piece, Spun Steel Body. Withstands Highest Pressures and Roughest Handling.
- ✓ No Soldered or Brazed joints to leak.
- ✓ Costs No More Than Other Dehydrators.
- ✓ Wide Range of Capacities—From 5 to 50 Cu. Inches.
- ✓ Both Ends Removable for "Ram Rod" Cleaning.
- ✓ Large Hexagon Adapters Provide Firm Wrench Hold When Refilling.

Insist on the best—Insist on "Rapid." Your Wholesaler can supply you.

FINE PRODUCTS COMPANY


711 W. LAKE ST.



CHICAGO 6, ILLINOIS

HERVEEN the Replacement Refrigerant

Service men—Herveen is the IDEAL REPLACEMENT GAS for Meter-Misers. When your Frigidaire Meter-Miser customers need service on their unit, don't turn them down with the statement "the refrigerant is not available." We can deliver

HERVEEN  the IDEAL

REPLACEMENT REFRIGERANT

Many service companies are using this refrigerant for charging Meter-Misers in their localities.

- ★ Meter-Miser calls become routine if you have a supply of HERVEEN.
- ★ Installing HERVEEN does not involve more than average care.

MODERN GAS CO., Inc. Manufacturers & Refiners
1084 Bedford Ave., BROOKLYN 5, NEW YORK

CALIFORNIA REFRIGERATOR CO. HAS NEW OWNER

THE California Refrigerator Co. with two stores, one located at 1077 Mission Street, San Francisco, and the other at 441-23rd Street, Oakland, announces a change in ownership through the purchase of its entire stock by Gerald S. Robinson of Seattle, Washington. Mr. Robinson, although a native Washingtonian, claims some previous California background in that he received a portion of his early schooling in San Francisco.



G. S. ROBINSON

He is a graduate of the University of Washington, Class of '31, and has a background which is principally banking, having served for three years as Executive Secretary of the Washington Banker's Association and for six years Vice-President of the Pacific National Bank of Seattle, Wash.

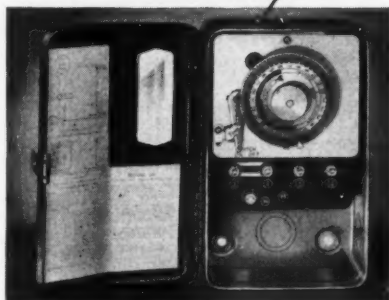
In 1942 he volunteered his services to the U. S. Navy where he remained on active duty until December of 1945, at which time he was released holding a commission of Lieutenant-Commander. He saw action in the South Pacific for fourteen months where he served as operations officer-in-charge of advanced base airfields, moving up the Solomons during 1943 and 1944. Since leaving the Navy, he has been back with the Pacific National Bank where he recently resigned to enter the Wholesale Refrigeration Parts field.

"Sandy" Pratt, former owner and well-known to the refrigeration industry as a whole, has, with the help of his fine staff, built up a progressive and well-organized institution. Mr. Robinson plans to continue along somewhat the same lines and has announced his two store managers as Lem Branson in San Francisco and Carl Willhoft in Oakland. These men are deserving of considerable credit for the rapid expansion of the California Refrigerator Co. since its pioneering days and they both have a host of friends among the trade. "Sandy" Pratt is planning a well-deserved retirement and will devote much of his time to his two hobbies, the "Outdoor Christmas



Part of the display area of recently remodeled San Francisco Store, California Refrigerator Co.

**Defrosting
AUTOMATICALLY
CONTROLLED**



● BY PARAGON TIME SWITCHES

Why worry about defrosting? Here's a Switch that provides dependable time control for SHARP FREEZERS in all types of automatic defrosting . . . in locker plants, dairies, breweries, packing houses and commercial refrigeration. Regular defrosting increases efficiency and reduces operating costs.

The PARAGON LINE offers service proved . . . precision . . . quality Time Switches and Timers . . . rugged and durable . . . with a great performance record.

Paragon can produce Time Controls for any system such as Freon, brine, ammonia, etc., regardless of temperature and whether defrosting is done by hot vapor, electric heat or water spray. Put your defrosting problems up to Paragon engineers.

PARAGON ELECTRIC CO.

1636 TWELFTH STREET
TWO RIVERS, WISC.

ALL MODELS

Telechron
MOTORED

Paragon *Two Rivers*
WISCONSIN

MAKERS OF ELECTRICAL EQUIPMENT SINCE 1903

SERVICE ENGINEER

**EVEN AN EXPERT
IS SOMETIMES
STUMPED**



Like the checker-playing expert, the refrigeration serviceman—old-timer or youngster—sometimes finds himself up against a problem, the answer to which he either cannot remember or never has learned. Yes, servicemen are often stumped—and that's why so many of them turn to Utilities Engineering Institute for the training they know will give them the thorough brushing-up they want.

How highly refrigeration concerns value U.E.I. training is proved by the PHILCO CO. which has again called on the Institute to train members of its service organization.



U.E.I. BALANCED TRAINING

A high-quality method of training that combines practical home study with technical shop practice. It's the course which men in refrigeration are today putting to profitable use. How about you? When you find yourself stumped, it's time to arm yourself with the right answers.

Write today for FREE FACTS about U.E.I.'s helpful, thoroughgoing training program. Serving the industry since 1927.

UTILITIES
Engineering Institute

Dept. 45, 1314 W.elden
Ave., Chicago 14, Ill.

Please give me more information about Refrigeration and Air Conditioning Training.

Name

Address

City State

Tree Association" and the "distribution of baby redwood trees" to his friends all over the world.

New Store Being Remodeled

The California Refrigerator Co. has purchased the building at 23rd and Valley Streets in Oakland and are presently remodeling. Their new store will have three times the space now occupied. This work is expected to be completed sometime within the next two months and an announcement will be made upon completion. The San Francisco store was remodeled at the beginning of the year where a rearrangement of departments has given a great deal of additional space for display and counter purposes. New light fixtures and air conditioning were added and a complete redecorating of the inside are features intended to please their many valued customers.

§ § §

GENERAL CONTROLS APPOINTMENTS

ADDITIONS to the New York Factory Branch sales staff of F. E. Weldon and A. C. Kelterborn have been announced by J. F. Ray, Director of Sales, General Controls Company, Glendale, California.

Mr. Weldon was graduated from Rensselaer Polytechnic Institute as an industrial engineer, and has been active in the electrical and mechanical control industries with the Westinghouse Company in New York and Arens Controls in Chicago. Weldon is a native New Yorker.

Mr. Kelterborn, an alumnus of Cornell University, is an experienced sales and consulting engineer in the electrical field. He was formerly associated with the Hunter Fan and Ventilation Company, and Burns and Roe, Consulting Engineers, in New York.

§ § §

NEW SUPPLY HOUSE IN DULUTH

ANEW refrigeration supply store located in Duluth, Minn., is announced by C. A. McCafferty, President of the new firm. It is known as Refrigeration Wholesalers, Inc., and located at 7 North 20th Avenue, West.

Mr. McCafferty is well known in the refrigeration industry, having been associated with it for 19 years. He is a member of long standing of RSES and was recently active in the formation of Head of the Lake

Chapter in Duluth. He is also a member of A.S.R.E.

§ § §

McCOMBS RATINGS TUBING BERGER JOINS COMPANY

THE situation on copper tubing has reached the point where one wholesaler has found it necessary to set up a rationing system for his customers.

McCombs Refrigeration Supply Co., Denver, Colorado, has notified their customers of the necessity of a rationing system and included with the notice is a card on which, it is requested, the service firm list its estimated requirements for the year. These cards are to be filed by McCombs and future shipments of copper tube allocated to each in quantities dependent on the amount received.

Lt. John V. Berger, recently discharged from the Navy after 2½ years service, will be associated with McCombs Refrigeration Supply Co., in a sales and engineering capacity. He is a graduate Electrical Engineer from M. I. T. and before entering the Navy was engaged in the refrigeration and air conditioning business.



J. V. BERGER

§ § §

SPORLAN VALVE PERSONNEL CHANGES

H. F. SPOEHRER, Sporlan Valve Company, announces the return of William F. Wischmeyer to the company after having been in the Navy for over three years. He was a Radar Officer on the staff of an LST flotilla and spent the last year and a half in the Pacific. He participated in the landings at Leyte, Lingayen Gulf, and other spots. Mr. Wischmeyer is now heading up the Engineering Department and will be in charge of design, development and application engineering.

A newcomer to the organization is Mark D. McAnany, who will handle advertising, catalog work, and all other publications of the company.

Also returning to the company after more than four years in the service is Peter J. McCarty, who was in the Cryptographic Di-



Arlington

SHAFT SEALS

3 Exclusive Features



FLAT SEAL FACES

— Uniform — flat —
smooth — seal faces.

POSITIVE FLEXIBILITY

A diaphragm acting
synthetic rubber ring.
No sliding fit between a rubber
part and shaft or sleeve.



HIGH GRADE MATERIALS

High grade steel and
bronze of known wear-
ing quality are used for
the seal faces.

Ask your jobber about the

Arlington

SHAFT SEAL

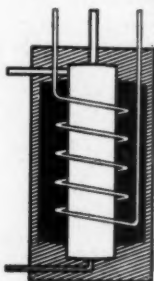
MODERN DESIGN PRODUCTS CO.

3944 W. LAKE ST.

CHICAGO 24, ILLINOIS

SERVICE ENGINEER

KRAMER Products



PATENT APPLIED FOR



PANEL TYPE
UNIT
COOLER

The

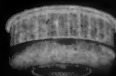
THERMOBANK

With the THERMOBANK a zero
degree system is just as auto-
matic as a 40 degree system
— in fact more so.

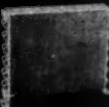
It never needs to be defrosted
because it defrosts
itself automatically
without the use of
brine sprays, water
sprays or electric
heaters.

Write for
Bulletin
TV345-RS

COOLMASTER



RADIAL
UNIT COOLER



AIR COOLED
CONDENSER



FLOOR
TYPE
UNIT
COOLER

KRAMER-TRENTON CO. Trenton, N. J.

Model R-142 - 405 Series - 1945

vision of the Signal Corps and spent two years in Europe. He is in charge of the Order Department and is responsible for scheduling and all other work in connection with the handling of customers orders.

SEIBEL RETURNS TO LYNCH

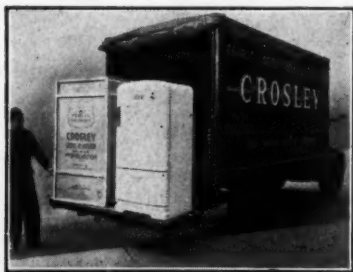
LT. COL. Richard R. Seibel has resumed his position as Works Manager of the Defiance, Ohio plant of Lynch Manufacturing Corporation, Toledo, after serving 4½ years with the U. S. Armed Services. Mr. Seibel joined Lynch in 1939 and entered the armed services in June, 1941. He served as Executive Officer of Combat Command "B," 11th Armored Division and was Camp Commander of Mauthausen Concentration Camp, Mauthausen, Austria which had 18,000 prisoners, representing 21 nations. He returned to the U.S.A. in October, 1945 and rejoined Lynch upon his release from service.



R. R. SEIBEL

THE LATEST IN APPLIANCE DELIVERY EQUIPMENT

THE Harry Alter Company, Crosley and Coleman distributors in Chicago, have equipped their new two ton delivery trucks with the latest, sensational, hydraulic lift tailgate. No more will Crosley refrigerators,



The hydraulic lift tailgate

radios, or Coleman heaters and other heavy appliances be dropped from the tailgate, developing concealed damages. With the hydraulic tailgate, products are gently, quickly and efficiently lowered to the sidewalk level

without the slightest jar. Also on pickups, such as home delivery from a dealer's store, a refrigerator, heater, range or washer is lifted from the sidewalk to the truck, hydraulically, without danger of marring its beautiful finish. The Harry Alter Company has installed these hydraulic tailgates to insure delivery of the fine and beautiful Crosley and Coleman products in perfect condition to the customer.

BEALS IN EAST FOR HENRY

HENRY Valve Company, 3260 W. Grand Avenue, Chicago 51, Illinois, announces the appointment of Norman Beals as Field Engineer.



NORMAN BEALS

Mr. Beals attended Washington University in St. Louis, Missouri, Murray State University, Murray, Kentucky, and Southern Illinois State University.

Prior to joining the Henry organization he was a Design Engineer for a St. Louis manufacturer, later becoming a Field Tooling Engineer and Chief Industrial Designer for manufacturing concerns in Dayton and Brooklyn.

Mr. Beals will work with Henry's Eastern Manager, C. W. Hudzietz, covering the Eastern states and New England.

ELPECO APPOINTMENT

WITH initial deliveries of Green Dragon Thermotrons to wholesalers now scheduled, Electric Power Equipment Corp., Philadelphia, has announced that John B. Borah is heading up its division of flow control instruments.



J. B. BORAH

Borah joined the Elpeco organization on January 1, after having devoted more than ten years to development engineering in this field. He is an alumnus of Washington University, and is a member of A.S.R.E.

LEAKS?

Find them with VISOLEAK

VISOLEAK detects even the smallest leaks before they cause damage to expensive refrigeration systems. Years of use prove it safe, economical, easy to use.

NEW CHARGING SET

The VISOLEAK Charging Set was developed to inject VISOLEAK, add refrigerant oil, or recharge sealed units. For use on all types of refrigeration systems without danger of introducing air or foreign matter.

Charging Set—complete with hoses. \$7.50
Filler only—without hoses. 6.00

WHOLESALE PRICES

4 ounce bottle. \$ 1.00
8 ounce bottle. 1.75
1 pint bottle... 3.00
1 quart bottle. 5.00
1 gallon can... 16.00

CASE LOTS

48 bottles
24 bottles
24 bottles
12 bottles
6 cans

SAVE 10% ON CASE LOTS

See your refrigeration supply jobber or write for complete information.

WESTERN THERMAL EQUIPMENT COMPANY

1701 West Stauson Avenue

Los Angeles 44, Calif.

GASKETS

GASKETS



• Play safe and specify CHICAGO-WILCOX gaskets for every refrigeration need. Our complete gasket service provides a dependable source of supply to meet your requirements. Get full details to day.

Write for complete catalog.

CHICAGO-WILCOX MFG. CO.
7701 Avalon Ave. Chicago 19, Illinois

SERVICE ENGINEER



• Here's the safe bet when it comes to motor-capacitor replacements. • Safe because Aerovox listings indicate the right exact-duplicate or universal replacement for any motor. • Safe because your Aerovox jobber has a stock for your immediate convenience. • Safe because Aerovox, pioneer of the electrolytic motor-starting capacitor, has a reputation to maintain. • Ask your Aerovox jobber for latest catalog—or write us.



FOR RADIO-ELECTRONIC AND
INDUSTRIAL APPLICATIONS

AEROVOX CORP., NEW BEDFORD, MASS., U.S.A.
Export: 13 E. 47th St., New York 16, N.Y. • Cable: "ARLAB"
In Canada: AEROVOX CANADA LTD., Hamilton, Ont.

HOTPOINT MAKES APPOINTMENTS

EDISON General Electric (Hotpoint) Appliance company announces the following appointments:

District sales managers: H. L. Cushing, Dallas, Tex.; W. R. Hall, Boston, Mass.; S. J. Houston, New York; D. H. Risher, Charlotte, N. C.; and W. A. Summers, Buffalo, N. Y.

Sales promotion managers: L. O. Braun, eastern region; W. W. Gibbs, southern region.

\$\$\$ ANDERSON RETURNS TO BACHARACH

COLONEL A. H. ANDERSON who, before he left for duty with the U. S. Army, had been with the Bacharach Industrial Instrument Company since 1923, has returned to the company in the capacity of Manager of the Heating Division. Colonel Anderson left for duty in January, 1941, as Signal Officer, 28th Division. Later, he became Assistant Signal Officer, Army Ground Forces, Acting Signal Officer, Fourth Army and then went into combat as Signal Officer of the XII U. S. Army Corps. This was the spearhead corps of General George Patton's famous Third Army. He remained with the XII Corps during its stay in England and through all of the fighting across France, Germany and Czecho-Slovakia.

After VE Day, Colonel Anderson had charge of rehabilitating the communications system of Eastern Bavaria with headquarters in Regensburg, Germany. He returned to the United States early this year. Colonel Anderson was singularly honored by the governments of France, Russia and Luxembourg as well as his own country, having been decorated seven times for his work and activities in combat.

Colonel Anderson returns to Bacharach as Treasurer and a member of the Board of Directors. Because of the entry of the company into instrumentation for the refrigeration and air conditioning trades, and its expanded activities in the heating field, he will devote his entire time to the management of this division.



A. H. ANDERSON

CARRIER FREEZERS IN PRODUCTION

RETAIL outlets operated by cooperatives, granges and other farm organizations will be used by Carrier Corporation to push sales of its 1946 food freezers in agricultural areas; it was announced. While the freezers will be sold by Carrier's 4,000 regular dealers additional sales coverage in electrified rural districts is assured under an agreement signed with the United Cooperative of Alliance, Ohio, representing agricultural groups with a total membership of 1,300,000 families living in eastern, midwest and southwestern farm regions.

Built in two sizes to accommodate the heavier quick-freeze needs of farm homes, the models have 15 and 30 cubic foot capacities holding about 600 and 1200 pounds of food respectively. Carrier's production line is planned to produce 3,000 freezer units a month. The first 1946 models rolled off production lines recently.

\$\$\$ J. J. NANCE TO ASSIST PRESIDENT OF G.E.

CHARLES E. WILSON, president of General Electric Company, announced today the appointment of J. J. Nance as a member of the president's staff. For the last five years Nance has served as vice-president of Zenith Radio Corporation, Chicago. Previously he was for many years connected with General Motors Corporation.

\$\$\$ LIGE HEADS PENN CHICAGO BRANCH

WALTER W. LIGE has been appointed manager of the Chicago branch office for Penn Electric Switch Co. of Goshen, Indiana, to succeed E. B. Maire, resigned, according to R. H. Luscombe, sales manager.

Before joining Penn, Lige was regional merchandise manager of Montgomery, Ward & Co. In this capacity he was in charge of sales for building materials, plumbing and heating equipment. Previously, Lige was associated with Bell & Gossett Company as a field representative and later as production manager. In addition, Lige



W. W. LIGE

MILLIONS OF STEEL
JIFFY CLIPS
 SERVING THE ELECTRICAL INDUSTRY

Specify MINERALLAC
 HANGERS, CLIPS,
 STRAPS AND BUSHINGS

Expert design, choice materials and controlled manufacture have built "top-service and longest life" into Minerallac Electrical Specialties. That's why the electrical industry "prefers Minerallac"

... In steel and Everdur for hanging pipe, conduit, BX cable, etc.

Send for new literature and prices.

MINERALLAC ELECTRIC COMPANY
 25 NORTH PEORIA STREET—CHICAGO 7, ILLINOIS
MINERALLAC



There's a Good Reason

... why more and more Servicemen, Contractors and Buyers of Refrigeration supplies come to KRAMERS.

We'd be bragging if we told you ... so, why not send your next order to us and discover for yourself the many advantages in buying from—

FRED C. KRAMER CO.

212 N. JEFFERSON ST.
 CHICAGO 6 ★ ILLINOIS
 Phone RANDolph 6288-89-90

STOP



**TERMINAL
 LEAKS
 COMPLETE
 KIT**

(2 Terminals)

\$550

PAT. PENDING

Please Mention
 Jobber's Name

**Coldspot Couplings
 and Dome Gaskets.
 Immediate Delivery.
 25 cents each in lots of 10**

**WAGNER REPLACEMENT
 TERMINALS**

A research development designed to repair terminal leaks on sealed units, instantly and permanently on the job—

IN 5 MINUTES

No special tools or equipment required. Now available for Crosley F 12. Soon available for Frigidaire, Westinghouse, Norge, Kelvinator, and TECUMSEH (Chieftain) UNITS.

KINGS COUNTY REFRIGERATION CO.

1257 Flatbush Ave., Brooklyn 26, N. Y.

Firm

Address

Jobber

Send Check or Money Order
 We Will Ship Prepaid

No. of Complete Kits..... No. of Couplings.....

No. of Dome Gaskets..... ☐ C.O.D. ☐ Pre-Paid

Why Do It The Hard Way?



SHANK DEHYDRATORS

**Cost less to replace than
to refill.**

This high quality, low priced dehydrator is now available.

Made of 1" & 2" seamless tubing. Silver brazed ends. Leak-proof. A felt pad filter of sufficient size and texture insures a clean flow of refrigerant. Furnished dry sealed. Filled with either Calcium Chloride, Activated Alumina or Silica Gel.


IMMEDIATE DELIVERY

Prices and specifications on request.

CYRUS SHANK COMPANY

625 W. Jackson Blvd.
CHICAGO 6, ILLINOIS

Says **GASKET JOE**



HERE'S
YOUR
QUESTION-
ALWAYS
ASK IT!

"DID I LOOK
AT THAT
DOOR
GASKET?"

2-A

JARROW PRODUCTS

420 N. LA SALLE ST., CHICAGO 10, ILLINOIS

has had considerable experience as a consulting engineer and as a branch heating manager for Crane Co.

The Chicago office of Penn Electric will remain in its present location at 520 N. Michigan Ave.

EBCO APPOINTMENTS

MR. LEE LOVE, General Sales Manager, The Ebco Manufacturing Company, of Columbus 8, Ohio, announces the appointment of John P. Rainbault as District Manager, Oasis Cooler Division, with headquarters at 1355 Market Street, San Francisco, Cal., and Ronald D. Gray as District Manager of Ebco's Oasis Cooler Division, with headquarters at Jacksonville Beach, Florida, covering the Southeastern United States.



J. P. Rainbault



R. D. Gray

Mr. Rainbault will supervise sales in the Pacific Coast States of California, Oregon, Washington and Nevada. Prior to his association with Ebco, he was manager of the Air Conditioning and Commercial Refrigeration Department of the General Electric Company. He has had many years of experience in the refrigeration and electrical industry, with other nationally known manufacturers.

Mr. Gray will supervise sales in the states of Florida, Alabama, Georgia, Mississippi, Tennessee, North Carolina and South Carolina. As a youngster with a mechanical bent, he managed to get a good whiff of SO₂ gas early in life while taking apart the refrigerator when the folks weren't at home. Apparently it got in his blood because he has spent his adult life selling water coolers and commercial refrigerators.

Mr. Gray came up the hard way, as all successful commercial men do, progressing step by step from ringing door bells to top national volume producer for Westinghouse Commercial in 1942.

ARE YOU Equipping a new Serviceman

Equipping a new Truck

Going back into Service Work ?

We have prepared a very helpful list of items suggested as a minimum stock. Several lists are available. Check the ones you want.

- ☐ Services Tools
- ☐ Parts for Domestic Service
- ☐ Parts for Commercial Service

Use your letterhead and send your inquiry to Dept. A.

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C.**

St. Paul, 4, Minn.
2410 University Ave.
Milwaukee, 3, Wis.
749 No. Seventh St.
Des Moines, 9, Iowa
106 Eleventh St.
Cedar Rapids, Iowa
503 Fourth Ave. S.E.
Great Falls, Mont.
306 First Ave. South

Controls Repaired & Rebuilt

Just Mail in Controls—We Handle The Rest

COMMERCIAL—DOMESTIC— INDUSTRIAL

One Year Guarantee
Each Control Reset and Cycle Tested

Domestic Cold Controls (Modern Type) \$2.00
Commercial Controls (Pres. or Temp.) 2.50
Commercial Dual Controls 3.00
Automatic Water Valves 2.00
Automatic Expansion Valves 1.75
Thermostatic Expansion Valves 3.00

All Prices F.O.B. Chicago and subject to change without notice

ACME CONTROL SERVICE

5528 Lawrence Avenue—Chicago 30, Illinois
Phone PENnsylvania 2303

SILVER SOLDER KITS



For refrigerator
Contractors and All
SERVICE MEN
KIT INCLUDES: One 5-oz.
Tube XCEL-FLUX "SS" Sil-
ver Solder Paste. Twenty 5-in.
lengths (Total 100 in.) SILFOS
and EASY-FLO Silver Brazing
Alloy— $\frac{1}{16}$ " $\frac{1}{8}$ " and $\frac{1}{4}$ " wires
and one EASY-FLO .005" x 1"
strip.

Jobbers discounts on orders for
12 or more kits.
PREST-O-LITE "4-in-1" Torch
outfits ideal for silver soldering
jobs \$6.50 F.O.B. Chicago.

AMERICAN PRODUCTS CORP., 804 Lowell Bldg., Chicago 5, Ill.

SERVICE ENGINEER

WRIGHT'S HEAD-BACK PRESSURE CALCULATOR

The purpose of the Head-Back Pressure Calculator is to quickly determine the proper head pressure, for the following refrigerants when the suction pressure, room temperature or mean water temperature is known.

Carrene	Methyl
Freon-22	Freon-12
Isobutane	Ammonia
Sulphur Dioxide	

A number of troubles can be detected by comparison of the existing head pressure and what the head pressure should be, but in the past there has been no convenient method available to the service engineer to determine what the correct head pressure should be.

It is not practical to depend on one's memory of other similar conditions or to just use snap judgment when this handy calculator gives you the correct answer so easily. Send for it today! Sturdily constructed, with oil-proof finish, for on-the-job use.

Postpaid \$1.00

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435 N. WALLER CHICAGO

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4 Books in One!



Covering:
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Servicing, Opera-
tion, Repair of
1. Household
Refrigeration
2. Special Refrigeration
Units
3. Commercial & Industrial Refrigeration
4. Air Conditioning
Systems

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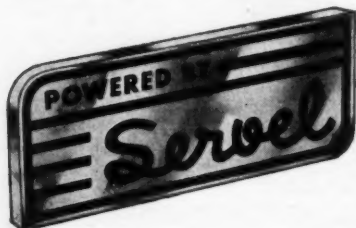
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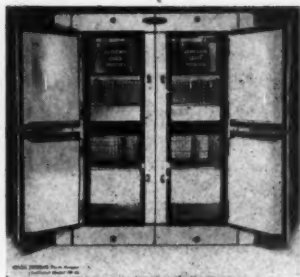
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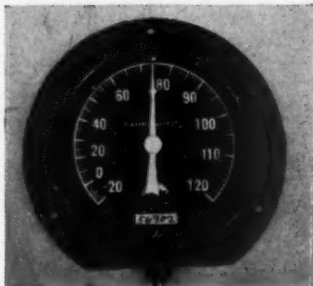


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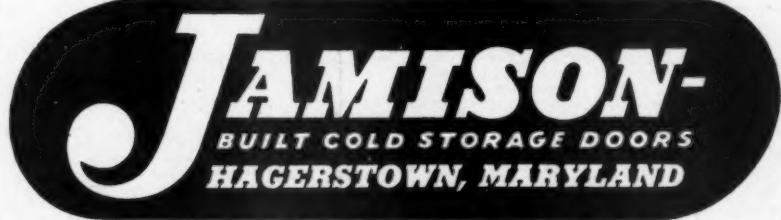
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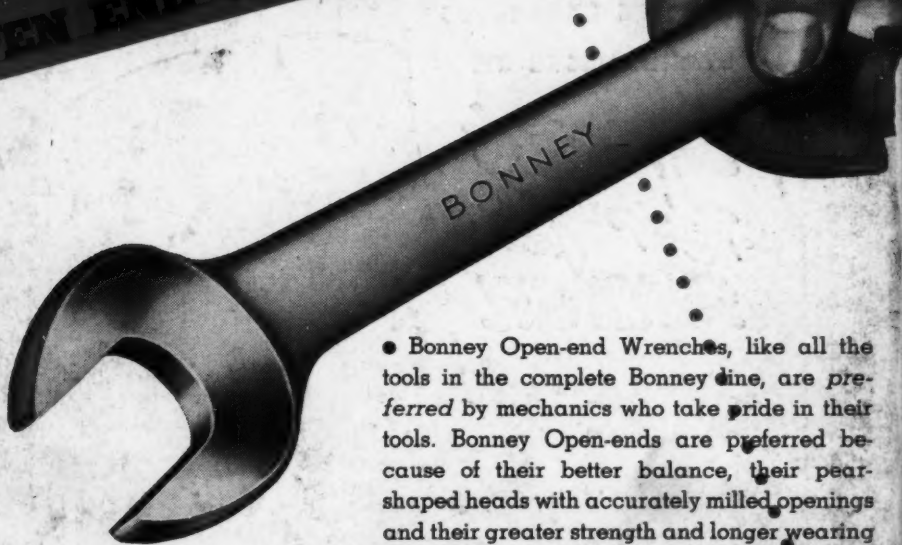
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